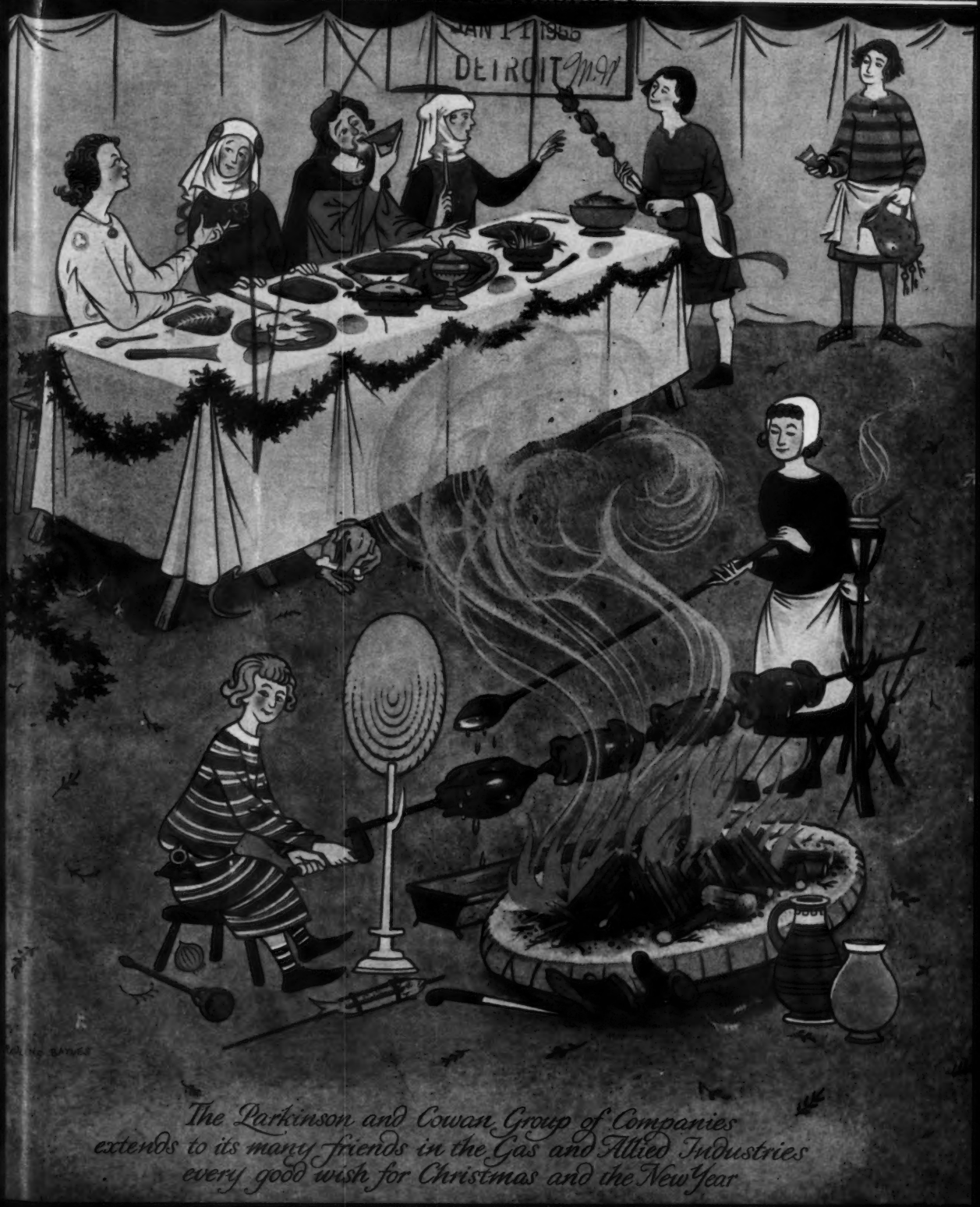
Gas Journal

VOL. 284. 107th YEAR. LONDON, DECEMBER 21, 1955 No 4829. PRICE 1/6



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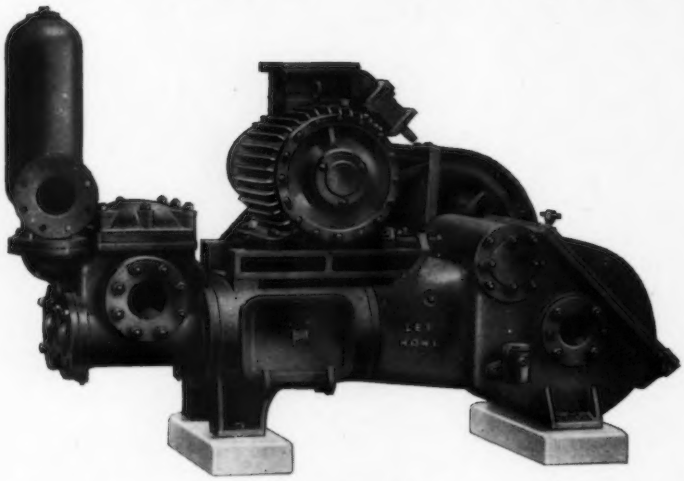

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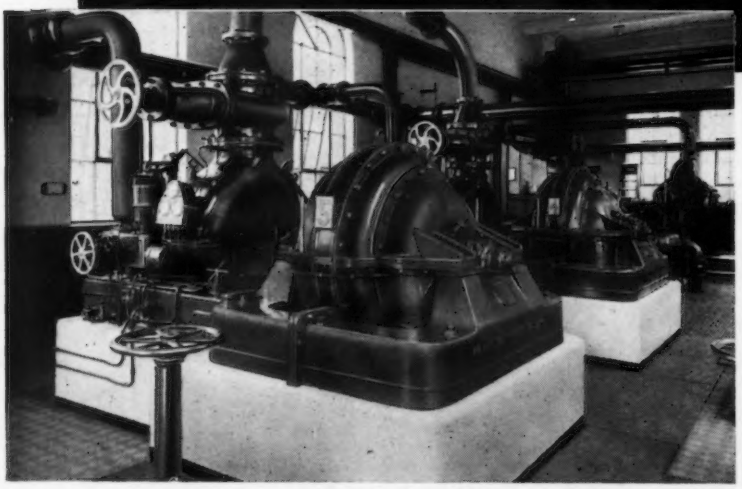

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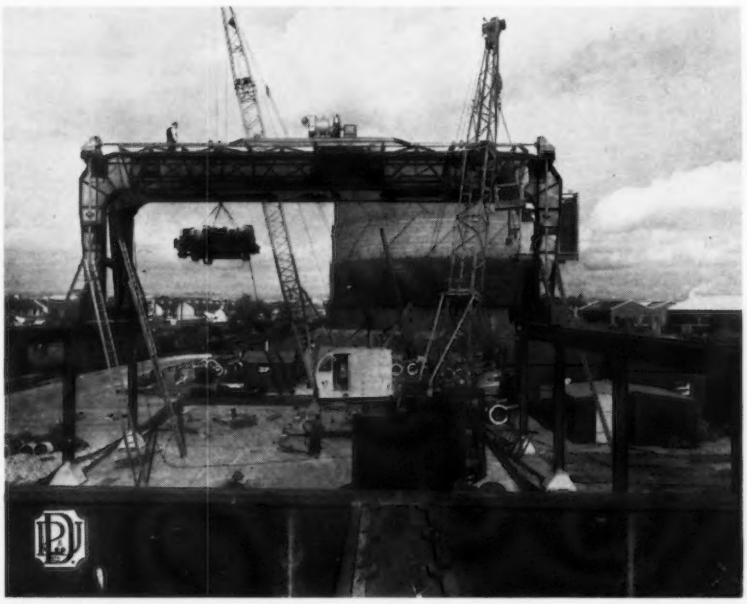

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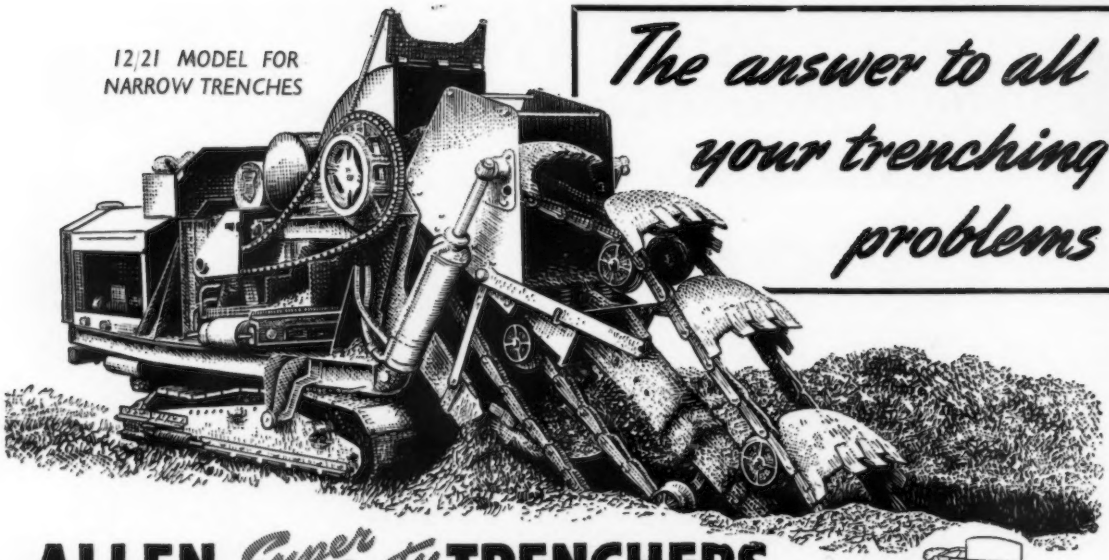

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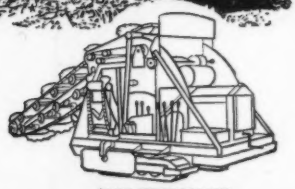

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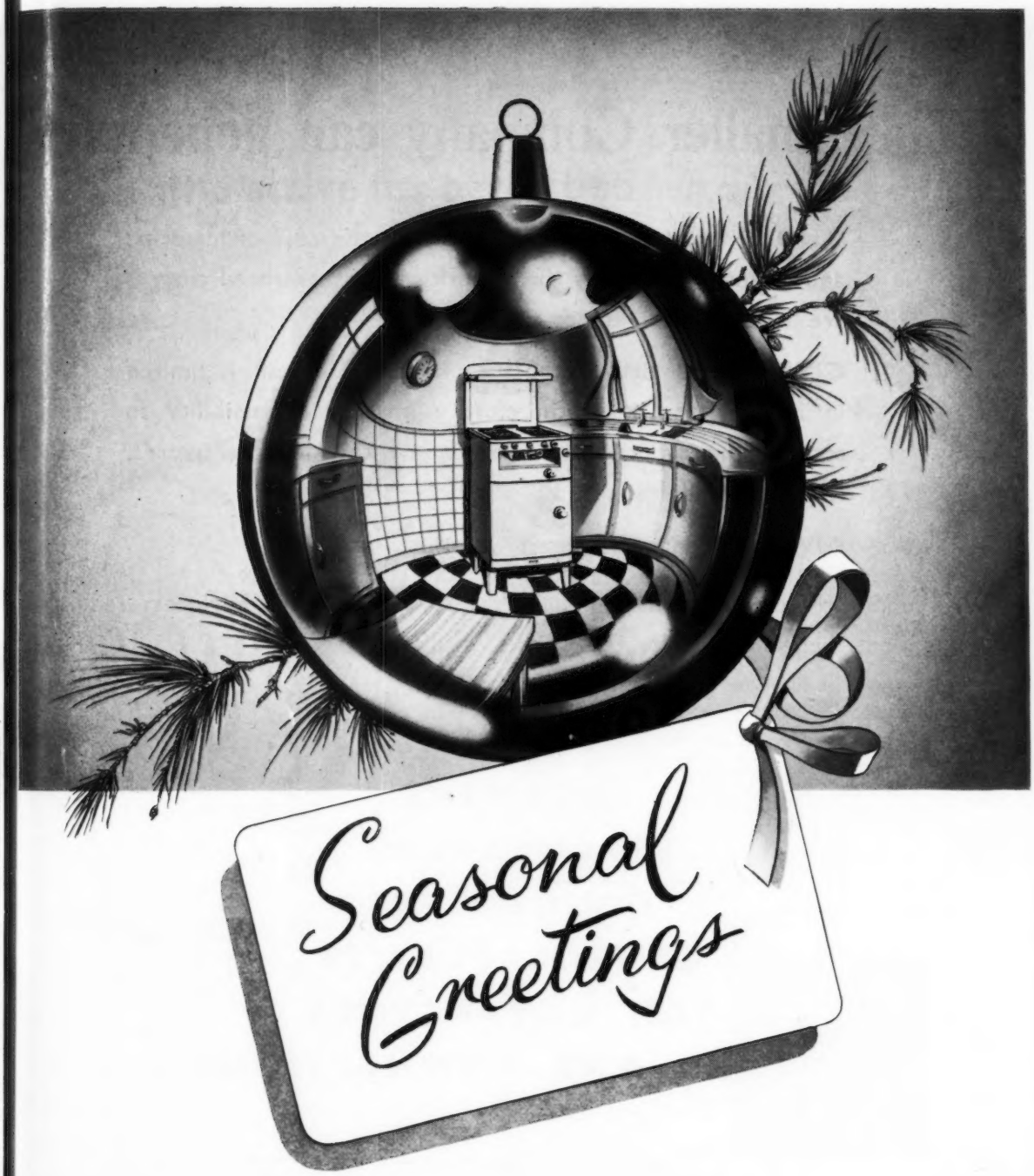

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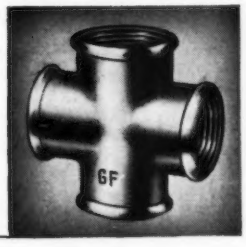

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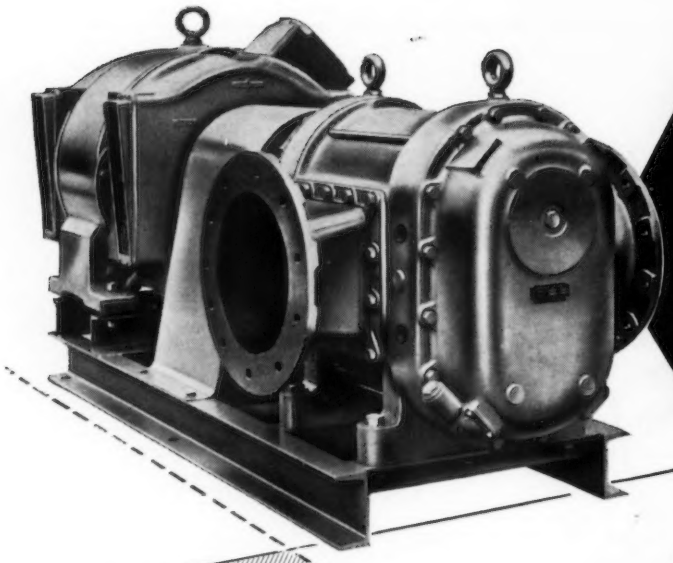

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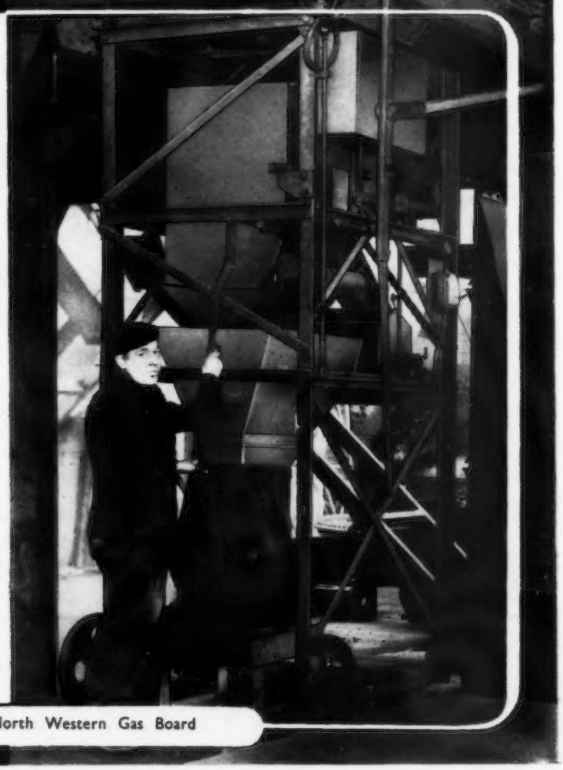
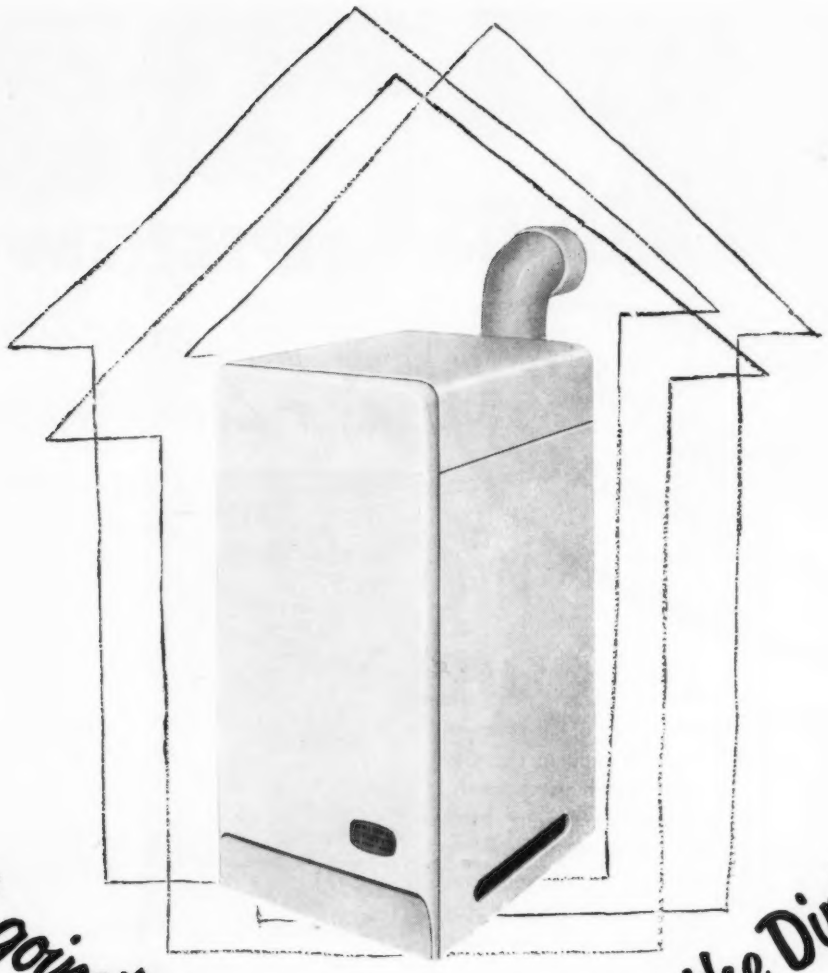


By Courtesy of the North Western Gas Board



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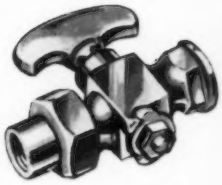

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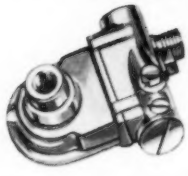

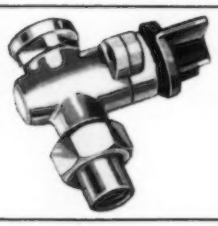

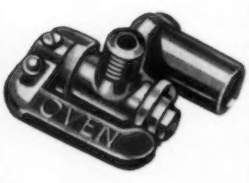

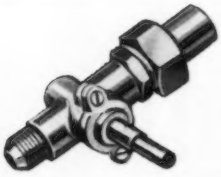

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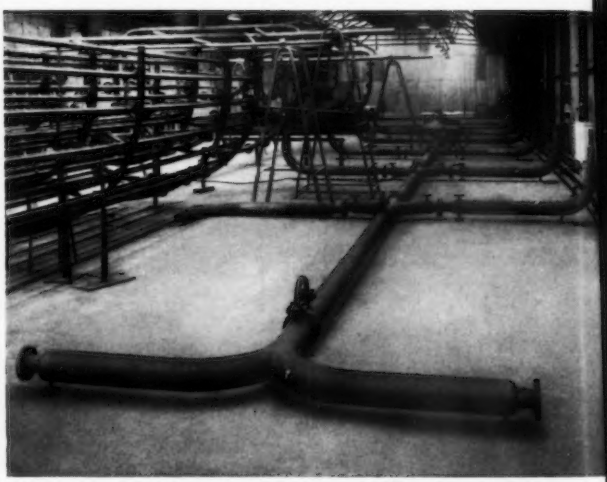

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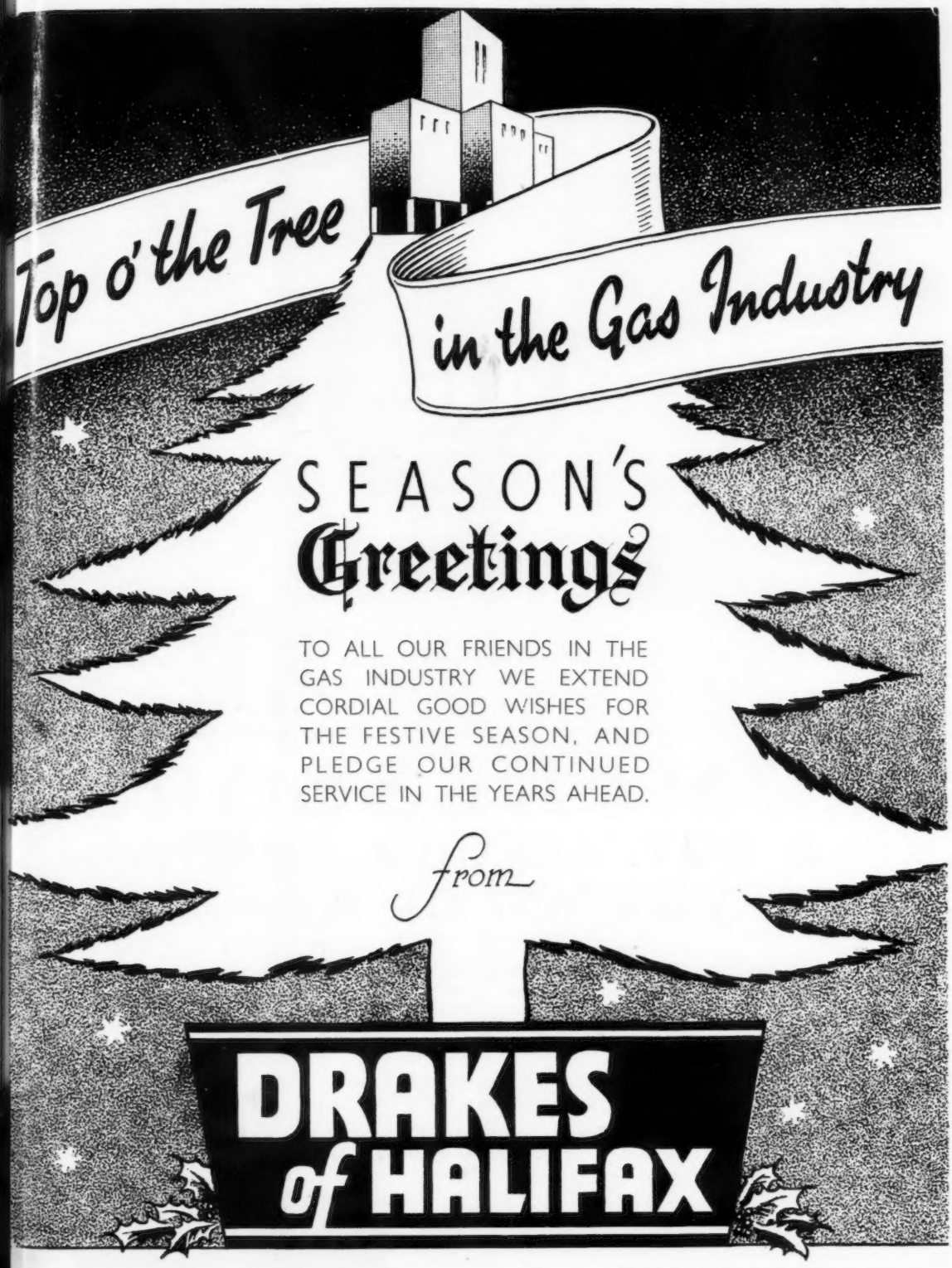
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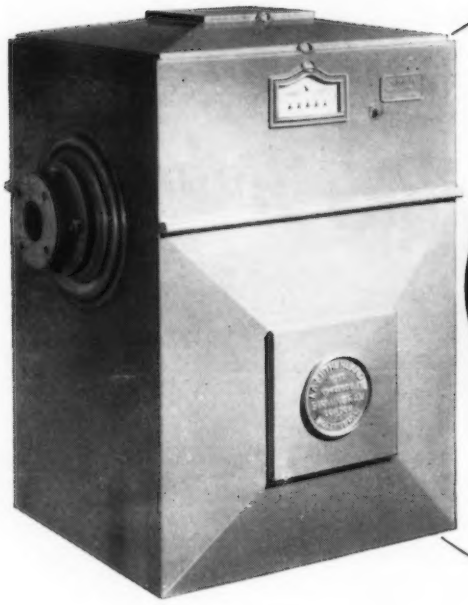

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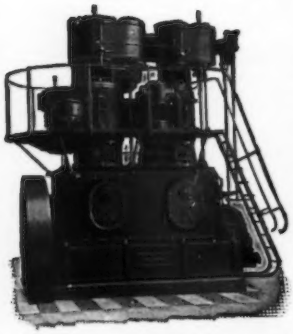

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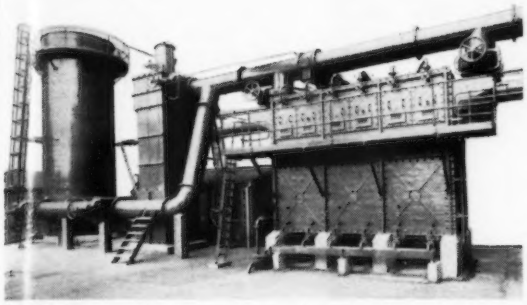
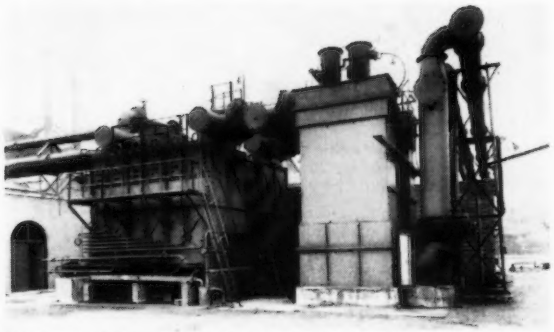
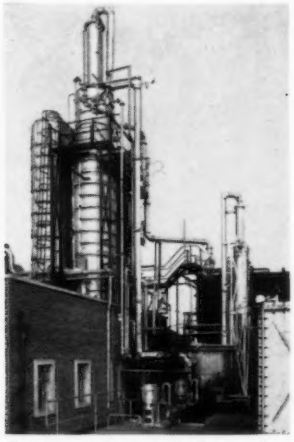


Wet purification plant comprising mild steel condenser, cast iron ammonia washer and plate-type electro-detarrer at Norwich for Eastern Gas Board.

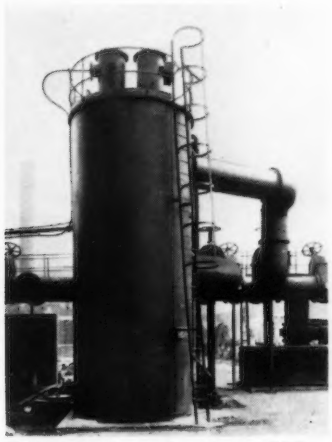


Washers and detarrers at New Wortley for North Eastern Gas Board.

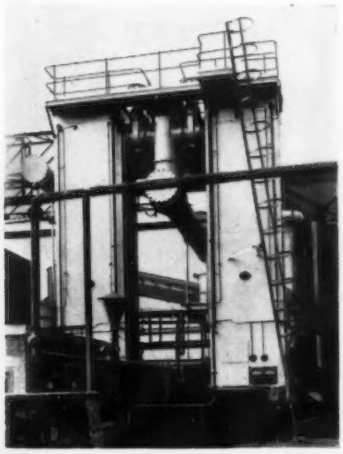
Effluent liquor treatment plant for Southern Gas Board.



Concentrated ammonia liquor plant at Bristol for South Western Gas Board.



Tube-type electro-detarrer at Oldham for North Western Gas Board.



Mild steel vertical water-tube condensers at Bristol (Canon's Marsh Gasworks) for the South Western Gas Board.

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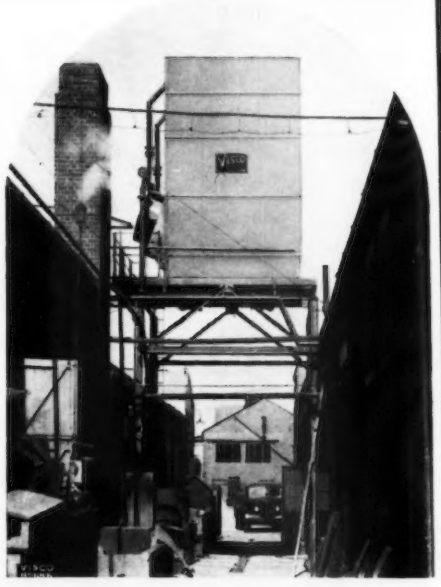

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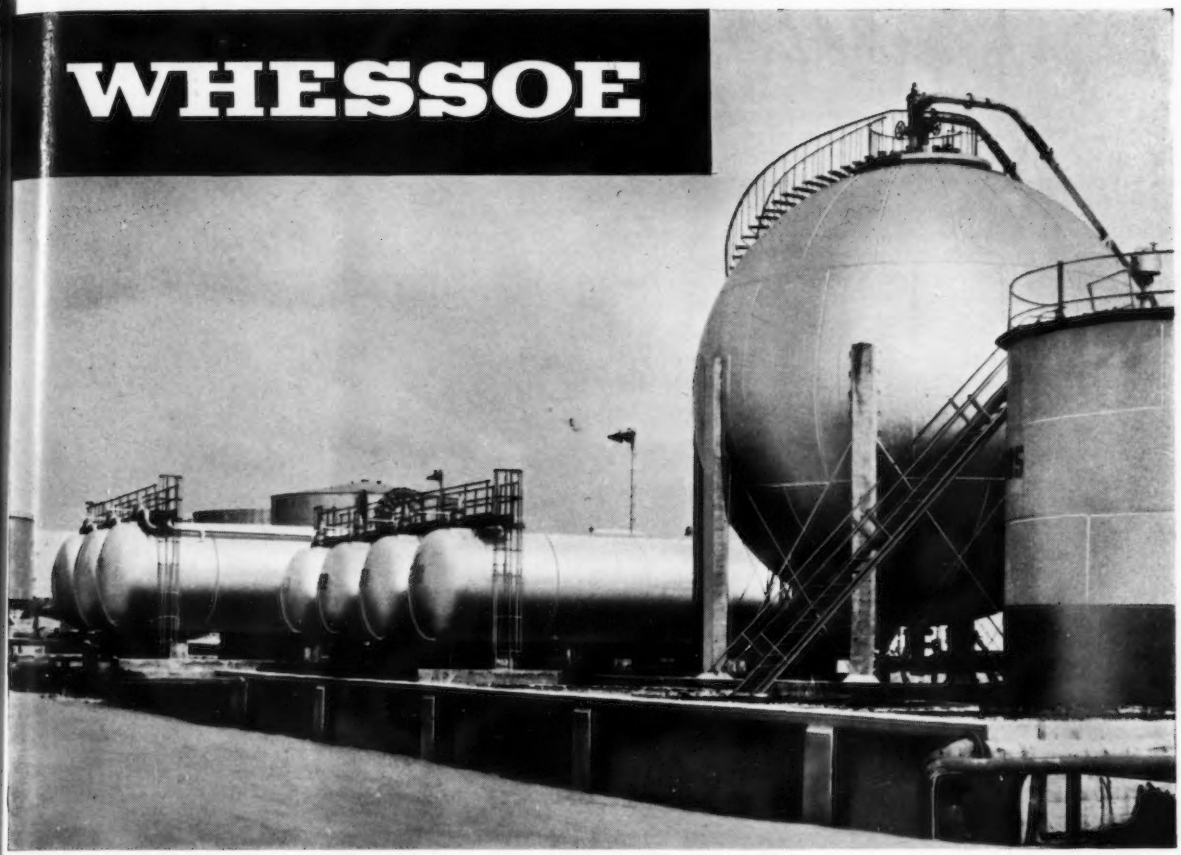

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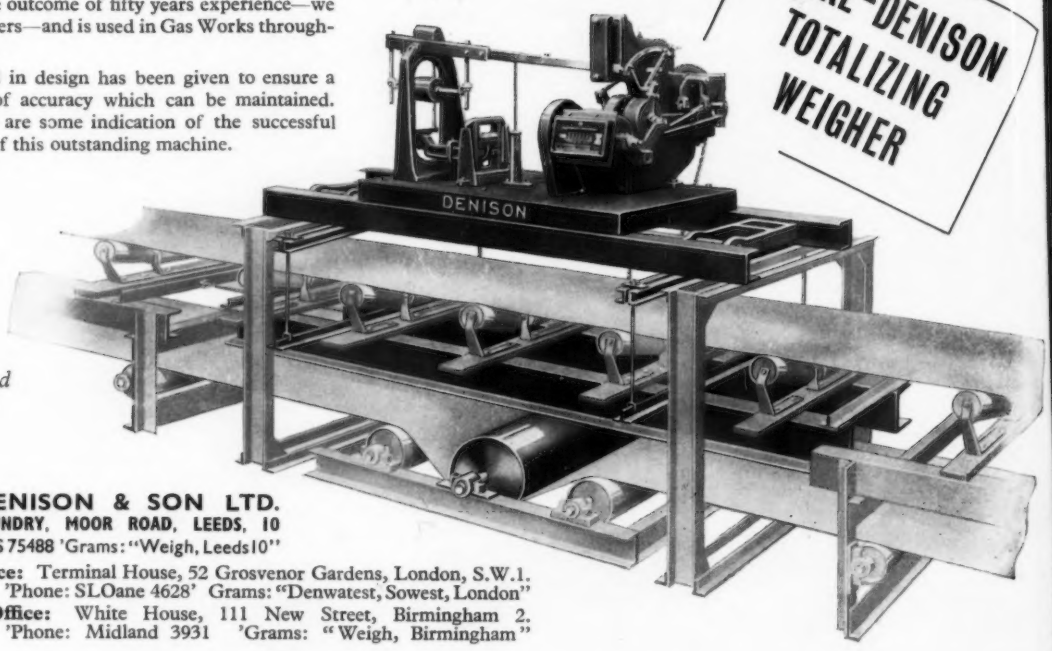

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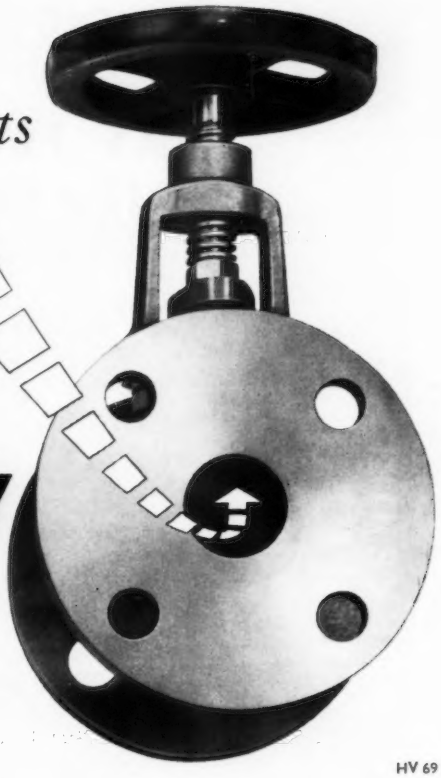

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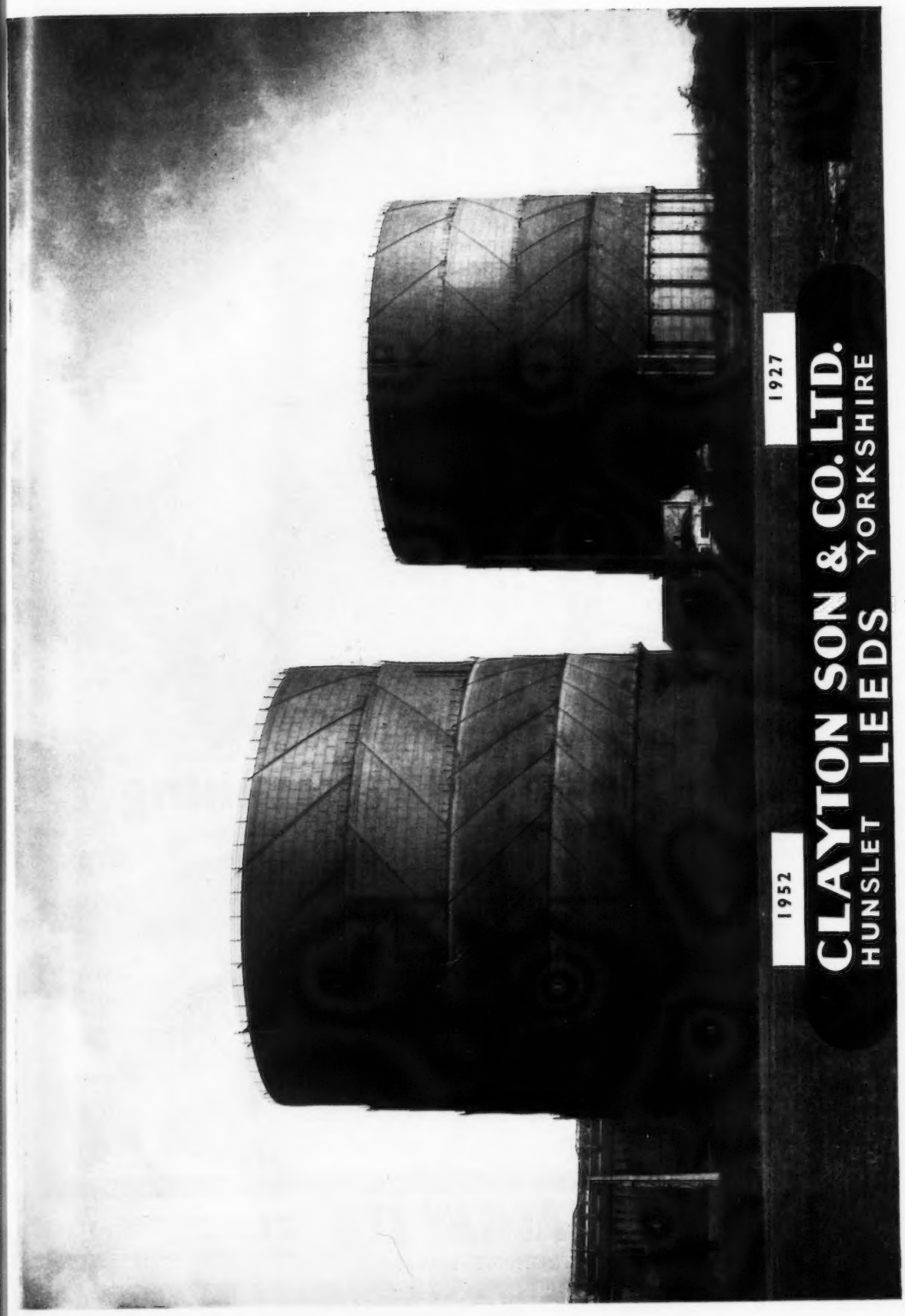
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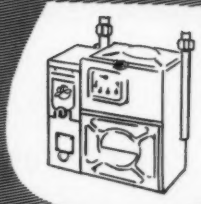

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Gas Journal

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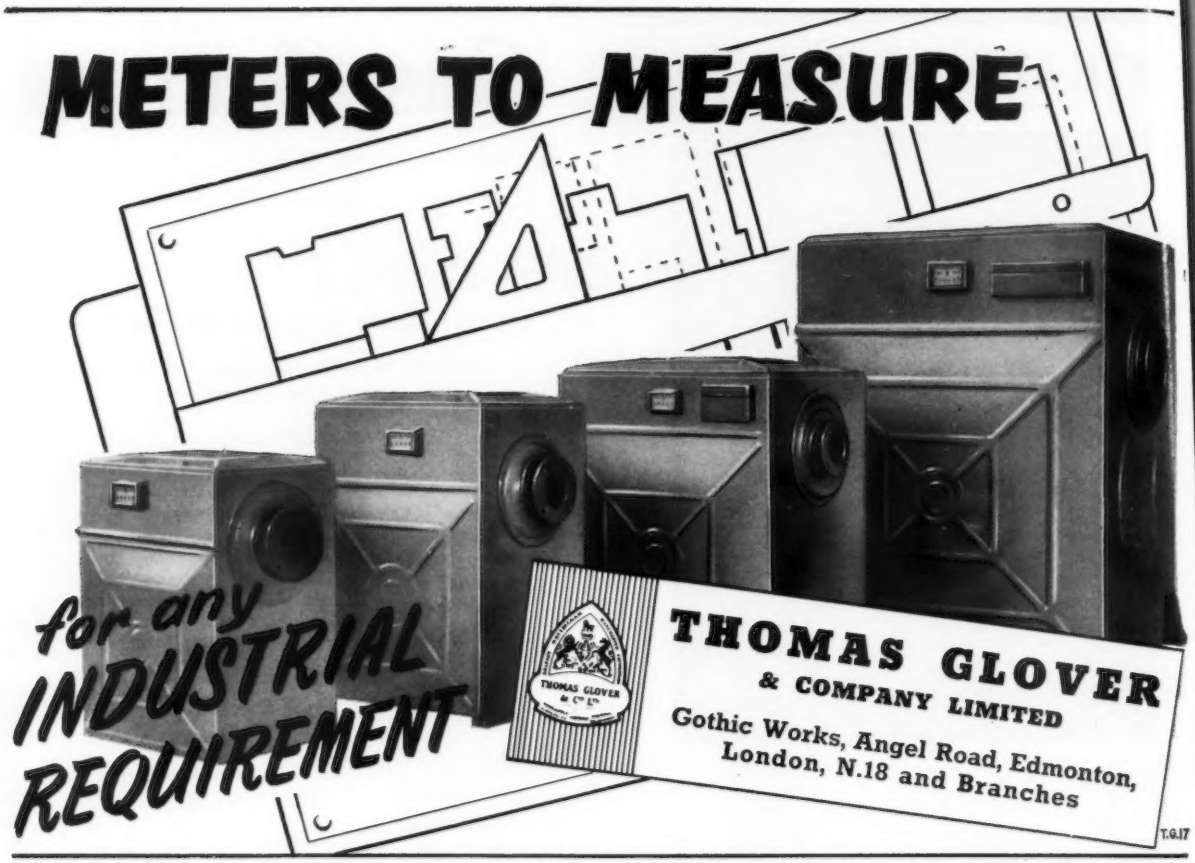

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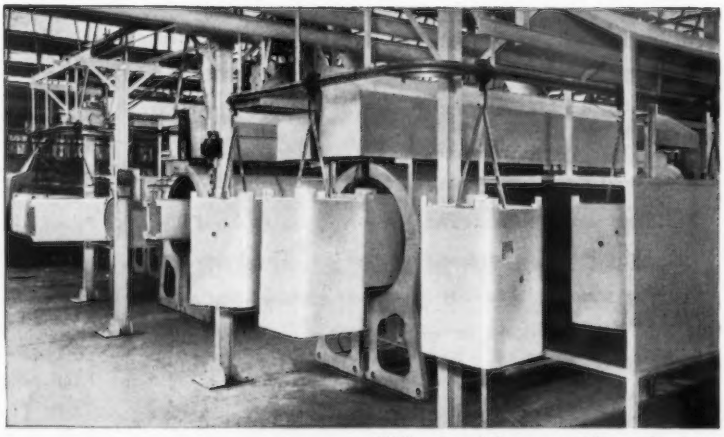

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Gas Journal

VOLUME 284. No. 4829. DECEMBER 21, 1955. 107th YEAR

We Wish All Our Readers A Very Happy Christmas

Forever at a Loss

THE National Coal Board has announced a deficit for the third quarter of this year of almost £5 mill. which despite a general increase of 18% in the cost of coal in July is more than the £4 mill. deficit for the same quarter of 1954. There are two principal items of expenditure by the Board, however, that are each greater than this deficit and that could bear some examination. First, the estimated interest payable to the Ministry of Fuel and Power is stated to be £5¼ mill., the greater part of which is for interest payment to the holders of as-yet-uncompensated-for-stock. Second, the loss on imported coal, which is, in effect, a subsidy to lower the price of foreign coal in relation to that of British coal, was £8½ mill. This figure was reduced to just under £2 mill. by appropriating 3s. 2d. per ton saleable of all coal. In other words, because some coal is imported the price of United Kingdom coal is 3s. 2d. higher than it would otherwise be. Nevertheless, it is still by far the cheapest coal in the world. The increase in coal prices, effective from July 18, was partly intended to recoup losses on imported coal. The Board consider that colliery and opencast results are more fairly presented by taking out of the proceeds of coal an amount broadly equal to the losses upon imported coal from July 18. Now, why must coal be imported? Because, without exporting any, only sufficient is mined in this country to satisfy our requirements. Thus, as some coal is in fact exported, some must needs be imported to establish a balance. One reason that coal is exported is stated to be the necessity for an economic barter for such general items as food. But there is a deeper reason. Before the war a great part of our total exports was coal—up to 90 mill. tons a year. It is hoped that eventually our production of coal might again be so much in excess of our requirements that this figure might be re-established. Therefore, the markets must be kept open by exporting small amounts. Very well; it seems that we must import coal, but why subsidize it? As we have said before, our home price is the lowest in the world. If the price was raised to a more realistic level, which would still be below those prices prevailing in most countries, there might be no need for a deficit. Or if coal were put on a free, supply and demand, competitive market, the prices might well remain at their present low level, or even drop. For then, the individual mines would feel the necessity of working at a profit, as before nationalisation. True, prices were raised in July, but to have avoided a deficit they should have been raised in March. The Board were apparently aware of this, and prices might have been raised then had there been no election pending. For coal price increases must, traditionally, have Parliamentary sanction. This is bad, for it means that the economic foundation of the Coal Board depends upon vote-catching. But this deficit business is deteriorating. Although none is expected in the final quarter of this year, due to the facts that there are no holidays and men are inclined to work harder before Christmas, the total deficit for 1955 will be approximately 1½ times the accumulated deficit from vesting date until the end of 1954. The only answer is to increase the price and risk the votes. Apart from eradicating the deficit, however, a far more tangible result could be achieved. With the coming of the Clean Air Act, consumers of fuel must, apart from the power of the law, be offered a deterrent to the consumption of smoky fuel, *i.e.*, raw bituminous coal. That deterrent would be in the form of higher prices. They could then be offered an inducement to the consumption of smokeless fuels, *i.e.*, coke and gas. Although the basic costs of these fuels would be forcibly increased by the rise in coal prices, the subsidy on imported coal would no longer be required and could be transferred to the prices of coke and gas, thus keeping them level, or perhaps reducing them. Subsidization of goods, as well as taxation, has been recognized as an influence upon national expenditure, and, by some logical planning, it might well be used as an influence upon the country's atmosphere

and health. But if coke and gas are to be subsidized to encourage their wider use the planning must be treated on a national basis by the Government and the industries concerned. This planning must, of necessity, also include the pledging of ample supplies of smokeless fuels to the consumers. This can only be done by ensuring a first priority of coal supplies to the gas and coke manufacturing industries. If the N.C.B., and the Government, could spare a little time for some anticipatory thinking, instead of constantly lagging behind their losses, they might free themselves of so much adverse criticism and apologetic embarrassment.

SOLID FUEL STORAGE

THE question of storage space in blocks of flats is still not taken seriously enough, and no move by local authorities or anyone else appears to have been made to alleviate the situation. This might well be simply because those who would do something about the position are waiting for those who could suggest *what*. It is remarkable, however, that whenever winter is part of the way through there is a move to improve our lot in the cold weather. The classic example was, of course, the Beaver Report, published at the time of the year when it was too late to implement the proposals to cut down the damage created by 'smog.'

Now, on a smaller scale, the winter brings another long overdue piece of news. This is that a joint committee of the London Regional Committee of the Coal Utilization Council and the London Branch of the Institute of Housing has been formed to inquire into the problems of fuel delivery and storage in blocks of flats. The new committee's task is to consider the manual difficulties of getting in and handling the fuel. It will also explore the possibility of preparing a code of practice which will assist the coal industry, owners, tenants, architects, and managers of blocks of flats to ensure that there are proper arrangements for handling and storing solid fuel.

The Committee's difficulties are not to be under-estimated—their problem is aggravated by the necessity of basing their estimates on the storage of coke rather than coal with its more modest space needs. We wish them inspiration and success. But might proposals and conclusions be published as soon as they are available? As it is they will not be of any use before winter, 1956.

PRODUCTIVITY IN PICTURES

THIS is the age of the strip cartoon in a world in which reading is on the way out and the cave drawing is rapidly coming full circle. We may well ponder the long term value of such fleeting things as, for example, the art of English letters. There is nothing wrong in revelation through line rather than word—Hogarth and Illingworth, Rowlandson and Low, though centuries apart, perform precisely the same function of showing current events seen with a certain civilized and cruel penetration. This must not be confused with the trend towards pictorial information and entertainment, which started so innocently with Pip, Squeak and Wilfrid, and progressed via Jane (strip indeed), Ripley and Horlicks to the nightmare imbecility of bulk pictorial entertainment for the masses, with the Best of *Punch* somewhere near the top of the tree and horror comics firmly rooted at the bottom.

It was in *Punch* that Ronald Searle introduced us to the tongue-in-cheek strip telling classical stories in strip form, maliciously vulgarized for the delectation of those who can still look into the abyss without giddiness. Devotees of these diverting drawings will have no difficulty in recognizing at least part of the inspiration for the North Western Gas Board's strip story of the 'Ascent of Mount Never-Rest'. Here is the same approach, even the same curvaceous maidens. Is it because of this derivation that the artist is un-named? It seems a shame, because this is a highly competent piece of work. Presented along the lines of the film scenario, the leaflet carries the title 'Link-Up Productions proudly present the "Ascent of Mount Never-Rest", the epic of the North Western Gas Board's sixth year success, with a cast of over 19,000.' Underlying the presentation as an amusing adventure story is the serious purpose of making dry-as-dust figures and facts not only intelligible but fun to read. It is issued to the Board's work people who mostly have not the time or the patience to wade through the full report. Each episode, however gaily presented, dramatizes a straightforward and serious text placed under each picture, from which no really important point in the report has been omitted.

It will be remembered that this Board pioneered this method of informing employees about the annual results of the organization to which they belong, and their previous 'popular' version excited considerable comment far beyond the boundaries of the Board itself. We notice that with this latest effort the North Western Board has again made news in the national Press, and no praise can be too high for this ability not only to impart to employees a sense of adventure and interest in their daily round, but to show that because an industry is nationalised it is not necessarily de-humanised.

BRITAIN AND THE EUROPEAN COMMUNITY

M. RENE MAYER, President of the High Authority of the European Coal and Steel Community, has commented in the Community's Bulletin from Luxembourg on the Treaty of Association with the United Kingdom. First, a few facts about the Community. Today half the Community's 'transition period' has now elapsed. The common market in coal and steel has been operating for over two years; tariffs, customs duties, quotas and currency restrictions are a 'thing of the past', international through rates for cross frontier rail transport have been introduced and the complete removal of discrimination in transport rates is under way. M. Mayer adds to this catalogue of achievements the fact that the reorganization of the large centralized buying and selling agencies to bring them into line with the Community's Treaty is imminent, 'and we shall see that agreements among producers to keep prices unjustifiably high, or to fix sales quotas, are rendered null and void.' Some cartels have already been banned and dissolved.

Elsewhere in the Bulletin is mentioned Britain's decision to cut her coal exports sharply from January next year, meaning a loss to the Community of 3 to 4 mill. tons a year. This, says M. Mayer, will put a further strain on European coal resources, and probably result in a rise of coal imports from the United States, and possibly in higher freight rates. Both the United Kingdom and the Community countries are main coal producers, and both are importers of United States coal, so what happens to freight rates is of common concern. Other problems would benefit from a common approach; notably measures to fight industrial diseases, investment policies, studies in the mobility and training of labour, the reasons behind growing disaffection for mining in spite of high wages, industrial techniques in coal and steel. Teams of High Authority experts have already visited coking plants in South Wales and factories in the United States. M. Mayer does not believe that association will come overnight. But it is from constant contact of this kind

that the growing relationship desired both by Britain and the Community will grow.

Other news about the Community is that coal output in the first eight months of 1955 was 2.4% higher at 162,969,000 tons than in the same period of 1954 (159,189,000 tons); output for the whole of this year is forecast at 246 mill. tons against 242 mill. tons in 1954. This compares favourably with Britain's performance in the same period. But the rapidly growing demand for fuels, resulting mainly from mounting iron and steel production, but also from the general buoyancy of the world's economy, has exceeded the expansion capacity of the Community's coal industries. Community mines suffer from problems similar to those well-known in Britain—uneconomic mines in some areas, and generally a high rate of absenteeism and falling man-power. Imports from the United States have been rising rapidly of late. In the first seven months of this year, total community imports of coal reached a monthly average of 1.5 mill. tons, compared with 1,157,000 in the corresponding period of 1954 (a 30.4% increase). In July they passed the 2 mill. ton mark, with three quarters of the total coming from the United States.

LIQUOR SPRAYING IN PERSPECTIVE

MUCH water has flowed under the bridges, some of it doubtless not unpolluted with gas liquor, since prominence was first given in these columns several years ago to the use of this material as a nitrogenous fertilizer. The deathly silence which has enshrouded the subject in the meantime, however, does not spell the demise of just another hare-brained idea. On the contrary, experiments over a wide area, steady development of the technique of spraying, and ever-growing use by satisfied farmers indicate beyond all question that liquor spraying has become a firmly established facet of the gas industry's operations. It should not be imagined that the use of liquor on the land will supplant the manufacture by gasworks of sulphate of ammonia; for a long time to come the two will remain complementary. Gas liquor spraying, on the other hand, does provide an alternative outlet for ammonia and, consequently, permits greater flexibility on works where concentration plants already exist. Also it must be the answer to many an engineer's prayer on works where effluent disposal is a difficult problem. We think, moreover, that this development will cause gas boards seriously to consider whether capital outlay on new concentration plant is justified. For even where an urban works is 20 miles from the nearest green field the cost of erecting and operating a concentration plant may considerably exceed the cost of organizing and operating a liquor spraying service.

While results of Ministry of Agriculture trials are still awaited, there is no doubt that the use of gas liquor has more than fulfilled its early promise. It shows many advantages, not least of which is cost, over solid forms of nitrogenous fertilizer, as speakers testified in the discussion on Mr. Lawrence's recent paper on this subject (p. 775). All praise is due to the little band of enthusiasts who, in the face of scepticism and scant encouragement, pioneered this outstanding development by ingenious improvization and with virtually no capital. While prominence has been given to the work in the southern counties, similar work has been going on elsewhere of which we hear little or nothing. This suggests that there is room for a good deal more co-ordination of information within the industry and a good deal more support by the Gas Council in the way of publicity. If much still remains to be done, the stage has been reached when more recognition and encouragement should be accorded at top levels. Mr. Lawrence's paper is timely not only because it has broken a long and painful silence, but because it puts liquor spraying into proper perspective as an established service of the gas industry.

THE TRADE UNIONIST

THE meaning of being a trade unionist was simply summed up last week by Mr. V. Feather, Assistant Secretary to the Trades' Union Council. He was addressing 480 representatives of 62 joint consultative councils within the South Eastern Gas Board (see p. 795). It was now, as it had ever been, to work for a higher standard of living for working people and that meant *all* working people.

Mr. Feather did not use those exact words, but he did point out that conditions have changed for the British trade unionist and that, in effect, it would be a good idea if he were to look around with wider eyes than hitherto. The same suggestion might well be applied to the management side of joint consultative councils. For, as Mr. Feather said, these councils can be the means whereby wide subjects of concern to all sides of industry can be discussed without inhibition. Since the war the poverty that beat trade unionism into its present position of strength has largely disappeared. The reasons for this are many, controversial, and too political for these columns. But still the trade union is all too universally regarded as industry's complaints and wage negotiations department. This is a totally wrong conception of what could be the most suitable medium for the inter-communication of thought and the development of a highly industrial civilization. It could mean that instead of a mere handful of men feeling that they were doing creative and worthwhile work, all workers would feel that they were as one with the growth of mankind. As Mr. Feather said, people who understand the relation of their work to the welfare of peoples of other countries are 'in a better position than those who work as if they are blind, and are merely working at a job.'

The T.U.C. Assistant Secretary reeled off at some length a list of gas industry by-products and coupled them with gas and coke as key materials in the battle to meet the export programme. And if more tractors are exported to India its millions, who are generally speaking underfed, can do without a little more of our sympathy. Is a knowledge of gas processes in tractor production going to make the average gas worker increase his efficiency for the sake of the world's two-thirds under-nourished? Mr. Feather is no fresh-faced idealist. On the contrary as he says, he was brought up on 'boiled cabbage and potatoes' and yet he still obviously refuses to be cynical where many, less experienced men would shrug and sneer.

HEATING AND VENTILATING

The ninth issue of the Year Book of the Heating and Ventilating Industry, published by Technitrade Journals, Ltd., Carlisle House, 8, Southampton Row, London, W.C.1, is intended to provide in one compact volume, technical, contractual and other trade information for the benefit of architects, consulting engineers, surveyors, and others in close contact with heating and ventilating contractors. The extent to which this purpose has succeeded is readily apparent after a brief glimpse through the volume. Upon a closer look, the reader will be amazed at its comprehensiveness. It includes several technical articles of contemporary interest, which we would recommend to the notice of gas engineers. The heating and ventilating list mentions a wide range of references that would take a lifetime to consult; these include a few pages of selected British Standards. The book contains the various standard agreements with up-to-date information including the new 'Form of Direct Contact, prepared by the Federation of Associations of Specialists and Sub-contractors, for use where a specialist firm undertakes work otherwise than under sub-contract.

Personal

MR. A. A. BISHOP, Sales Director of Morley Products (Padiham) Ltd., is in hospital recovering from an operation. Although the operation was not serious his recovery is unfortunately taking longer than was at first expected.

SIR EDWARD C. BULLARD will retire from the directorship of the National Physical Laboratory on December 31. The appointment of a successor to Sir Edward will be announced in due course. Pending the appointment of a new director, DR. R. L. SMITH-ROSE, director of radio research in the Department of Scientific and Industrial Research, has been appointed acting director.

MR. P. G. WRIGHT has been appointed to be Administrative Secretary, Watson House Centre, by the North Thames Gas Board. In view of the coming retirement of Mr. F. C. Smith, Secretary of the Watson House Centre, MR. G. W. EMRYS-ROBERTS is to be Technical Secretary, Watson House Centre. Other appointments announced by the Board are that of MR. J. A. D. HUTTON to be Commercial Assistant to the Divisional Manager, Central Division, and MR. A. K. SHAER to be Divisional Accountant, Central Division.

MR W. E. WHITNEY (Engineer and Manager, Bridgend Undertaking) has been appointed by the Wales Gas Board Assistant General Manager and Engineer of the Newport Undertaking in succession to Mr. A. H. Dyer. MR. S. G. MEADE, Newport Undertaking, has been appointed as Engineer and Manager, Bridgend Undertaking, in succession to Mr. Whitney. These appointments will take effect early in 1956 when MR. A. H. DYER takes over the duties of General Manager and Engineer of the Newport Undertaking from MR. J. F. RUST.

Obituary

ALDERMAN WILLIAM HODGSON MALCOLM died on December 11 at his home in Second Avenue, Coventry. He was a notable figure in the public life of Coventry and since nationalisation had been a member of the West Midlands Gas Board and Chairman of the West Midlands Gas Consultative Council. Alderman Malcolm had a wide knowledge of the gas industry and an intimate grasp of its details in all aspects which made him an ideal Chairman of the Consultative Council. Apart from his close interest in the gas industry he had a distinguished public career. He was a member of Coventry City Council for 28 years and was Mayor in 1948-49. Alderman Malcolm was a member of the Foleshill Rural Council from 1921 to 1928 becoming a member of the Coventry City Council in 1928 when the boundaries of the city were extended. He was elected an Alderman in 1952. Alderman Malcolm was a keen amateur radio enthusiast and his call sign G6Wx was known in many parts of the world.

LIEUT.-COLONEL W. CARMICHAEL PEEBLES, D.S.O., T.D., D.L., died on December 14 at his home at 10, Lennox Street, Edinburgh, aged 84. Chairman and Managing Director of Peebles & Co., Ltd., until his retirement in 1946, he will be mourned by many who remember his courtly and endearing presence at every meeting of the 'N.B.' Association and of the Institution. Colonel Peebles received his engineering training at the Baldwin Locomotive Works in Philadelphia, and joined his father, the late Mr. D. Bruce Peebles, at Tay Works, Edinburgh, in the year 1891, at which time the Company was manufacturing gas governors and gas engines. In 1896 he was made a partner, and with his brother, the late Mr. Arthur C. Peebles, was largely responsible for the development of the electrical side of the business, which in the year 1908 was separated from the gas side by the formation of the two separate Companies of Peebles & Co., Ltd., Tay Works, and Bruce Peebles & Co., Ltd., East Pilton, with new Boards of Directors. The gas side of the work held the Colonel's interest, and he remained at Tay Works as Director and Manager until in the year 1939 he was appointed Chairman and Managing Director. He remained on the Board of Directors until his death. Colonel Peebles was associated for many years with the old Volunteer Force and afterwards with the Territorial Army. When the first world war broke out he was in command of the ill-fated 7th Royal Scots, who were involved in the Gretna railway disaster in 1915. He afterwards proceeded with the survivors to Gallipoli. There he took part in the severe fighting of June, 1915, and the evacuation. He later served in Palestine and France, was awarded the D.S.O., was thrice mentioned in despatches and received the Serbian Order of the White Eagle. He relinquished his command in 1918.

MR. A. F. YATES, of Goole, District Engineer and Manager at Goole of the North Eastern Gas Board, has died in a London hospital. Mr. Yates was within a few weeks of his 65th birthday when he had planned to retire. Mr. Yates was a native of Halifax, and in 1905 entered the service of the Halifax Corporation as a technical assistant in the gas department. In 1914 he became Assistant Manager of the Warrington Corporation Gas Department, and in 1920 was appointed Gas and Water Engineer to Goole Town Council, remaining there until nationalisation in 1949 when he joined the Gas Board.

Diary

December 29.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2. Includes visit to Research Centre at Fulham. 2.30 p.m.

January 3.—EAST MIDLANDS G.C.C.: Victoria Station Hotel, Nottingham. 11.30 a.m.

January 3.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, S.W.1. 10.45 a.m.

January 4.—INSTITUTE OF FUEL, LONDON: 'Coal Research Problems and their Industrial Implications,' R. L. Brown. Institution of Civil Engineers, Great George Street, S.W.1. 5 p.m.

January 6.—LONDON AND SOUTHERN JUNIORS: 'Next Slide, Please!'—an aid to the presentation of technical papers, R. N. Le Fevre, 178-180, Edgware Road, London, W.2. 6.30 p.m.

January 7.—SCOTTISH JUNIORS (EASTERN): Short Paper day. Dundee.

January 9.—INSTITUTE OF FUEL, NORTH EASTERN SECTION: Four short papers: Case Histories, by the National Industrial Fuel Efficiency Service, Chemistry Lecture Theatre, King's College, Newcastle - upon - Tyne. 6.30 p.m.

January 10. — MIDLAND JUNIORS: 'Distribution of Gas in Birmingham,' R. W. Nelson.

January 11.—SOUTH WESTERN I.G.E.: 'Coal and its Treatment,' Dr. Idris Jones, C.B.E. Bristol.

January 13.—SCOTTISH JUNIORS (WESTERN): Short paper evening. Papers by C. M. Miller and R. Taylor. Gas Showrooms, 522, Sauchiehall Street, Glasgow, C.2. 6 p.m.

January 14. — YORKSHIRE JUNIORS: Short Paper Day. 'Some Advantages of Training on a Small Gasworks,' P. R. R. Stead, 'Pipe Bridges,' D. Craven, 'Air to Purifiers by Injector,' C. Stanton. York.

January 16.—EASTERN G.C.C.: Connaught Rooms, London, W.C.2. 2 p.m.

January 17.—LONDON AND SOUTHERN I.G.E.: 'Development of the Non-Domestic Gas Load,' E. Wulstan Atkins.

January 18. — INSTITUTE OF FUEL, LONDON: 'Utilization of Steam and Power in Modern Gasworks and Coking Plants,' L. J. Clark. Joint meeting with Coke Oven Managers' Association (Southern Section). Institution of Civil Engineers, Great George Street, S.W.1. 5 p.m.

Ammonia Liquor as a Fertilizer*

BY H. M. LAWRENCE, M.A.†

IN an old pamphlet printed in 1848 by Edward Taylor, of Rochdale, called *The Use and Value of Ammoniacal Liquor for Agricultural Purposes (British Guano), Dedicated to Farmers and Gardeners,* there are many examples given of the value of ammoniacal liquor. One may be quoted in full, but the rest lead to exactly the same conclusions.

'In the spring of 1845 I put on a meadow ammoniacal liquor, which I obtained at a Rochdale gasworks, and mixed with an equal portion of water. I borrowed the watering cart of the Town Commissioners, that with which the streets are watered. Where the cart stopped to turn when it was being applied, a larger quantity of the liquor ran on to the land, and on these places the grass was burned, and did not grow for some time; but on the other portion of the meadow where the liquor was applied, the difference was seen in a short time. The grass was of a lively dark green, and was considerably higher and thicker than the other parts of the field; indeed, the difference in appearance was so great, that many persons came to me to enquire as to the cause. The crop of hay was full twice as much as from that part of the field where it was not applied. Since that time I have used ammoniacal liquor on the whole of my farm.'

Other examples say '. . . . It speedily produces a dense, deep foliage, rank-looking, yet cattle will crop it closely, as it is produced very different with a similar-looking grass the product of farmyard manure, which they will respect and pass over untouched. . . . There has been an increased quantity and a very improved quality of grass. Its colour is darker than the other. Any stock prefer grazing on that side of the meadow . . . . a field of grass sprinkled in this way, after first cutting, was far superior to any other part of the field receiving manure of any other kind . . . . the part so sprinkled was ready to be cut down a second time in the course of fourteen days or three weeks, whereas the other part of the field, cut at the same time, was only beginning to spring from the roots in that time.'

All these conclusions were stated more than 100 years ago.

In 1936 the Committee appointed by the Institution of Gas Engineers to investigate ammonia liquor reported that the advantages of concentrated liquor over sulphate of ammonia were: first, cheapness of preparation, and secondly, the liquor did not remove calcium from the soil. The Committee found disadvantages in storage facilities, which they thought might prove expensive, in the variable composition of the liquor, which they found objectionable to handle, and in the fact that, on average, the ammonia content was not more than two thirds that of an equal weight of sulphate. On applying the liquor beneath the soil and between the rows of seeds scorching was eliminated and the Committee stated that in their opinion liquor applied in this way would give an equal performance with sulphate of ammonia. The Committee's experiments with grass, however, proved that although there was a considerable amount of scorching the grass quickly recovered and was greatly improved, and there was a considerable reduction in the number of weeds. Any one of the above quotations could have been written in the summer of 1951 after we had had some experimental experience.

It has been found that depending on the time of year, the kind of weather and sometimes on the type of herbage, the amount of scorching shown on the field after the first application of ammonia will vary considerably, being particularly heavy on a hot still day. If it has rained just before or just after the application the scorch is lessened. In fact, it will be found that scorch disappears quite quickly in about ten days and it is now almost certain that a reasonable proportion of the nitrogen contracted to be supplied to the farmer has not been lost; as can be proved by the luxuriant growth of dark green grass six weeks later and by its increased protein content. Soil lacking nitrogen will not only give a poor yield but the crop will also have less protein content. As for injury to cattle, it was found that the cattle did prefer the grass that had been sprayed and sometimes it is necessary to prevent their following the machine and licking the spraybar. Dairy cattle should be off for three days to avoid taint in milk. If possible the liquor should be delivered to the ground and not sprayed on the herbage, not only to lessen the scorch but also to lessen the loss from evaporation.

Crude ammoniacal liquor is the cheapest ammoniacal substance available in considerable quantity and its actual worth to the farmer depends primarily upon the relative cost of transport and its efficiency as a fertilizer compared with that of sulphate of ammonia.

Experience in the South

The statements made in this paper are taken mostly from my own experience, *i.e.*, only in the three Southern boards, since I think it is fair to say that most of the developments in these three boards stem from our experiments in Portsmouth in 1950. The three Southern boards sprayed about 5½ mill. gal. last year, of which the Southern Board's share was about 2 mill.

Originally, there was a great deal of criticism chiefly because it was felt that the liquor would have a toxic effect on plants and vegetation. Experiments have shown that the liquor has

Test field after nine weeks. 10 oz. liquor, left; untreated, centre; cocktail, on right.

no adverse effect on grassland and experiments with arable crops are being continued. In any case, the potential area in a 20 mile radius is so large that, if required, one need only rotate with spraying every ten years.

Investigations are being made into the possibility of using the liquor as a diluent for proprietary brands of weed killer in the place of water, and also into the introduction of some harmless staining compound into the liquor which might assist the driver of the tractor to maintain a steady course.

A number of field experiments have been carried out near Bristol, while Ministry of Agriculture advisory chemists all over the country have been busy on field trials with grass, kale and cereals, and it is hoped that results will be available in the future.

Some interim results have been collated and at a meeting a year or so ago attended by a provincial advisory chemist, soil chemists, county agricultural and horticultural officers and four district advisory officers, N.A.A.S., a survey was given on a questionnaire sent out to 27 farmers, referring to 205 acres of permanent pasture, 216 acres of temporary leys and 4 acres of kale. The general concensus of opinion of farmers was: (*a*) Dry period in August following application caused scorching of grasses and clovers, which was in evidence for two to three weeks. (*b*) Injury temporary only, beneficial effects being produced ultimately in all cases. (*c*) Wet weather soon after application required to avoid scorch. (*d*) Desirable to apply the liquor earlier in the year (*e.g.*, in June and early-

* From a paper presented to the London and Southern Section of the Institution of Gas Engineers on November 23.

† Engineer and General Manager, Portsmouth, Gosport, and Bognor Regis Gas Undertaking.

July). (*e*) The heavy equipment necessary for its application precluded its use on some soils very early in the season. (*f*) The odour was objectionable when used in proximity to built-up areas, and a few complaints had been made by residents in such areas. It does not last long, however.

British Natural Resources

The gas industry produces, say, 1,000 mill. gal. per annum of crude ammoniacal liquor, equivalent to approximately 250,000 tons of sulphate of ammonia. A considerable amount of energy is required to synthesize ammonia, the theoretical requirements being 1,673 B.Th.U. per lb. of liquid ammonia. Consequently, in view of the fuel situation it is suggested that this development should receive serious consideration and, furthermore, it is a quite simple solution to a large part of our effluent problem, particularly for smaller works where it is uneconomical to erect and maintain a sulphate plant. For instance, at times at Portsmouth we are actually selling more than the total output from works of a rated capacity of 20 mill. cu. ft. per day.

Contact has been maintained with the Ministry of Agriculture and with the local National Agriculture Advisory Services. These authorities have been examining the quantities of phenols and thiocyanate in the liquor applied with a view to assessing any possible deleterious affects. The Natural Resources Technical Committee of the Office of the Lord President of the Council came into the picture early, and we were in close touch with them with a view to the saving of sulphur, the supply of which, at that time, was very critical. When it is remembered that the sulphur in sulphate of ammonia represents a quarter of its weight, and the potential saving of sulphate of ammonia is a quarter of a million tons a year, one can understand the interest of the Natural Resources Committee into this development. Fifty thousand tons of sulphur at the present price of American rock of £20 a ton is a million pounds per annum saved in dollars. Furthermore, to neutralize this amount of sulphur would require, say, 100,000 tons of slaked lime, at, say, £7 per ton—another £700,000.

Liquor Storage

A difficulty put forward against developing liquor spraying on a large scale was that the season was short and that storage capacity at the works was not adequate to handle the liquor during off-season times. This was when the spraying season was at first thought to last only from May to August. We have now succeeded in lengthening this from January to November, for two reasons. First, that the farmers have now realized that they need the nitrogen in the ground as early in the year as possible to get a quick bite, and from their experience of our service over the last five years they realize that with our cross-country machines, in a normal year, we can get on to the land in January. In fact, during one very bad early spring we were working on the farmer's ground when he was unable even to get his own plant on to it. Secondly, some farmers suspect that the ammonia does not leach out in winter rains, and therefore we can get it on in November. On one occasion we sprayed in December on water meadows and the nitrogen still showed in the spring, and on another occasion a local farmer had cattle grazing on one of our sprayed fields on Christmas Day. For the other two and a half months of the year it is possible to increase storage capacity on the works by concentrating the liquor through the concentrating plant and back into the tank, thereby doubling or trebling the capacity of the storage. Then, when 10 oz. liquor is required it is only necessary to add water. Another advantage, of course, of this latter process is that the admixture also contains less potentially harmful constituents.

Markets for Liquor

Most of our work has been done on grassland, for the very good reason that it was easy and showed the best results quickly, but there are great possibilities on other kinds of agricultural products. For instance, it has been suggested that we might inject the liquor in row crop cultivation for crops such as sugar beet. With good tractor drivers it should be quite possible to do this.

The market for straw is a variable one, and it seems that in the early autumn, just after cutting, particularly with a combine, instead of taking the trouble to pick up the straw from the wind rows and baling it, one might just as well spray

1952 spraying. Note accurate alignment of strips.

the whole field immediately with liquor, which would help break down the fibres in the straw and stubble, and then to plough afterwards.

Another outlet with which we have experimented is the making of compost heaps. I remember that, in the early days, there was a pile of linseed straw, a material which is notoriously difficult to break down. We poured about 1,000 gal. of liquor into the middle of this heap by means of a perforated piece of gas barrel, and the effect on the heap was quite remarkable. It broke down far more quickly and much more satisfactorily than anything the farmer had tried before.

In order to maintain control on what was admittedly an experimental business in the early days we insisted on delivering the liquor in our own vehicles or in vehicles under our control to a sub-contractor who was paid by us to do the spraying. We collected the money from the farmer and handled the subsidy documents. We do not guarantee any results and do not take responsibility for agricultural results. Briefly we pay the cost of transport and spraying and in return the farmers readily pay us £7 or so for 1,000 gal. spread of 10 oz. liquor. This is a great convenience for the farmer since all he does is to telephone the Undertaking for spraying on a particular day and to pay the bill at the end of the month.

It is essential to keep the correct strength of liquor in order to maintain faith with the farmer. Now that there is a subsidy on liquor it must never be less than the 10 oz. strength on which our prices are based. Actually we usually send it out at about 11 oz. so that in any argument one can point out to the customer that he is in any case getting an extra 10% nitrogen for nothing.

It was a great step forward after a year or two when ammoniacal liquor was recognized by the Government as a nitrogenous fertilizer and an appropriate subsidy was granted. The subsidy is normally paid to the customer but if he so desires it can be paid to the undertaking and credited to his account for spraying. A contribution will not be made if the total quantity of eligible fertilizer is less than 4 cwt. The application for subsidy must be submitted within six months of the supply of the fertilizer.

Prices and Costs

Avoiding too much detail, but working on 1 cwt. of $NH_4)2\ (SO_4)$ containing about 23.8 lb. of nitrogen as against 133 gal. of crude liquor containing 2.17% NH_3—the advantage of spraying crude liquor as against spreading sulphate to get nitrogen into the ground is in the ratio of about 2 to 3. This is a reasonable comparison since the price of sulphate of ammonia delivered *to the station* in six ton lots is £19 14s. 6d., less £5 16s. subsidy, which equals £13 18s. 6d. To this, of course, would have to be added the haulage cost to the farm and distribution costs. Whereas the equivalent amount of liquor, which is 2,660 gal. *spread* when the farmer wants it, inclusive of transport and spraying, is £11 11s. after deducting subsidy. The subsidy is 5s. 6d. per ton per 1% by weight of nitrogen. Taking nitrogen of 10 oz. liquor at 1.78% and liquor specific gravity at 1=£2 3s. 8d. per 1,000 gal.

Design of Machines

There were obviously a number of handling problems to be investigated in the design of machine, which were thought to be a new development, so it seemed the first thing to do was to eliminate as many variables as possible. The easiest way to

do this was to standardize on a rate of application, and so tie that standard rate on to standard speeds of the ordinary agricultural tractor and not only to the agricultural tractor but to the equipment easily obtainable. The rate of application that most farmers ask for and for most of the outlets for standard 10 oz. liquor is the equivalent of 3 cwts. of sulphate of ammonia per acre. Now the liquor equivalent of 3 cwts. of sulphate of ammonia, allowing for losses by evaporation in hot weather or leaching in wet weather, is about 133 gal. of standard 10 oz. liquor per cwt. of sulphate of ammonia. Therefore, the equivalent of 3 cwts. per acre is 400 gal. This strength of liquor gives 2.17% of NH_3, which in turn, of course, has a nitrogen percentage of 1.78.

3 cwts. of ammonium sulphate at 23.8 lbs. nitrogen per cwt. =71.4 lbs.

4,000 lbs. liquor at 1.78% nitrogen =71.2 lbs.

The ordinary standard speed on the governor of a Fordson tractor is four miles an hour and the spray tanks, as obtainable from Ministry of Supply dumps, were ordinary aerodrome 400 gal. bowsers. We bought standard bowsers very cheaply, for £50 or so. We pulled them with ordinary Fordson tractors and all we had to do then was to make a spray bar and calibrate it for an even distribution of 400 gal. to the acre. In practice you will find an acre at four miles an hour can be done in about 20 minutes and one tractor will distribute from 5,000 to 10,000 gal. a day. This is the application and time factor around which the rest of the distribution is built up. To transport liquor to the sites we bought very cheaply—for some £500—new 4 by 4 Ford or Chevrolet 60L chassis and mounted thereon standard 1,200 gal. tanks, also obtainable for under £100. Therefore, one lorry containing 1,200 gal. will supply three bowsers, each containing 400 gal. The bowsers will each spray one acre at a standard tractor speed at a rate of application of 400 gal. per acre.

The use of concentrated liquor with local water was quite a useful technique which we developed in 1954. The idea is to save haulage costs. First we had to reach agreement with the various water boards in the area so that we could obtain water from fire hydrants. A method to ensure adequate mixing on the farms was evolved and chemical tests carried out on various occasions proved that the matter was quite satisfactory and could be used by unskilled labour. A supply of made-up check bottles is carried on the lorry to satisfy the customer. Another advantage of using concentrated liquor is that when one gets to the happy state of running short of liquor, retort house liquor can be concentrated and used.

For bulk haulage 2,000 gal. tankers fitted with vacuum brakes are suggested so that they can pull 1,000 gal. trailers or small two-wheel trailers of 500 gal. capacity. Two kinds of trailers are suggested because depending on the size of an order on a particular day sometimes it would pay to take the whole delivery as 10 oz. liquor and sometimes it would pay to work as follows: The large tank would go out to the job filled with 10 oz. liquor pulling the smaller trailer filled with concentrated liquor of 80 oz. strength. On arrival at the job the tanker drops its trailer and empties its 10 oz. liquor straight to the spraying machine; for the four loads thereafter it would act as a water carrier, picking up water from some nearby source of supply and mixing it, in its right proportions, with the concentrated liquor from the trailer. Thus the combine tractor/trailer will do a day's work without having to go back to base. The vehicles themselves should be 4 by 4 or 6 by 6 wheel drive, but this is not absolutely essential. In bad winter weather, however, or snow, which need not stop spraying at all, one would feel happier when one knew the transport trucks could get themselves out of trouble. It is absolutely essential, however, to have large connections, inlet and outlet, on the tanks, so that one can be certain of loading and unloading as quickly as possible, in all sorts of conditions in case of a breakdown of the power take-off or pump. Obviously, too, one should have standard quick-release connections.

For the spraying machines standard Ferguson or Fordson tractors and ex-R.A.F. bowsters with spraybars on the back of the bowsers have been used. For better and more accurate control the spraybar itself should be mounted on the tractor and preferably controlled, both for elevation and spraying by the standard hydraulic hitches. On the back of the tractor spraybar combination could then be hitched a series of 400 gal. bowsers on wheels feeding *by gravity* to the spraybar. The ideal combination for the whole system would be an overhead tank at the works feeding by gravity through large size pipes into the transporter tanker. The transfer tank could be designed in such a way that it would feed by gravity again into the bowser tanks, which, in turn, would feed by gravity into the spraybar.

In calculating these various heights it is as well to remember that farms are not always on flat ground so it is possible to lose or gain a foot of head when going uphill or downhill. Here again this would be quite easy to overcome by using hydraulic rams driven from the main tractor pump, to lift the tank relative to the chassis. It will be noted that large wheels

Bought 1951, 4×4 Ford 60 L with power take-off pump and 1,090 gal. tank.

are specifically emphasized and this is not only to increase their load bearing characteristics over poor ground. If they are made interchangeable with the tractor driving wheels they can be driven from a power take-off of the tractor through a suitable system of constant-velocity universal joints. As a further development it would be possible to make the two-wheel trailer permanently attached to the tractor with a spraybar between the two and have easily detachable tanks to drop on to the trailer chassis.

In rural and semi-rural districts there is frequently to be found a number of pressure/vacuum operated gully emptiers, operated either by local councils or firms of contractors who service farms by emptying cesspits and farmyard drains and who distribute the material over the fields. We have made use of these contractors and generally a reasonable price can be arranged because the load that we give them dovetails in with their normal work. The vehicles themselves are usually good ones, about 1,000 gal. capacity with independently driven exhausters for providing the vacuum pressure and they have the advantage of quick loading and discharge, and better still, that the sludge, liquid, or, as in this case, ammonia liquor, does not come into contact with the exhausting machinery. A further advantage is that being in this trade the contractors know local farmers' conditions and they know the fields and, in fact, in a way they are in the same kind of business which we are discussing.

DISCUSSION

Mr. J. Winser felt that only the fringe of the subject had been touched. He hoped to see the development of some form of hollow tined cultivator to put the liquor just beneath the surface. This would overcome the scorch trouble, though the scorch clearly did not affect the results. It would, however, make for greater efficiency in very dry weather and remove the complaint of smell. Next he would like to see an equally economical form of complete fertilizer available for application in the same way, for they did not only want to apply nitrogen. If they were going to spread some 400 gal. of water on each acre in order to get their nitrogen there, it seemed ridiculous to send another machine over the same land to spread the phosphates and potash. Further, Mr. Winser did not like carting all this water about. Surely the next step was to follow American practice, take the anhydrous ammonia, which was all the land needed, and apply it as a gas. Sales of ammonia gas in the Southern States would quite soon outpace the sales of all other forms of nitrogenous fertilizers. The appalling numbers of accidents which were foretold had not

occurred, and the cost of application and transport had not been too high. The gas was non-corrosive, and pressures were not excessive. Thinking over the whole scheme, Mr. Winser felt that perhaps the really important point had nothing to do with agriculture. Here they had a nationalised industry, foredoomed (according to sections of the daily Press) to frustration and failure. Yet someone outside made an odd suggestion; someone inside was wide awake and noticed the oddity—and within a matter of hours things started to happen. Over the short space of two or three seasons a completely new outlet was found for a troublesome by-product. The whole thing was built up by clever improvisation from scrap material, at an astonishing speed, and with virtually no expenditure of capital. Not a bad industry, commented Mr. Winser, that employed men who had ideas and let them get on with the job as the Southern Gas Board had done in this case.

Mr. R. N. Quirk observed that the greater use of gas liquor was a means of reducing imports of sulphur, and he was convinced that the gas industry was using its products in this way to the best possible advantage and was thus practising good husbandry.

Mr. F. Clifton Sherriff stressed the value of gas liquor on the small farm where heavy capital expenditure on implements was rarely justified. He had carried out a small experiment in the spring on adjoining strips of identical grass, the one with liquor and the other with an equivalent dressing of sulphate of ammonia. From visual observation it appeared that while the sulphate eventually produced an approximately equal bulk of grass, it took a great deal longer to do it. As regards the extension of the spraying season, he asked whether liquor should be applied when the ground was frostbound. He had also noticed this year, after the second application of liquor, that certain field weeds had died off, a point commented upon by the 1936 Committee. A future development which he considered would also be of great value to many farmers would be to combine the liquor with a selective weed-killer, for modern intensive ley farming demanded regular application of such weed-killers, and to be able to do both jobs with a single application of liquor would be most useful. Finally, he wanted to make it clear to the gas industry that it was faced with very keen competition in this product from thousands of agricultural merchants up and down the country who were striving to maintain their business in sulphate of ammonia and nitro chalk. And this was supported by powerful advertising in the farming Press. He said that if the gas industry really wanted to dispose of more liquor on a country-wide basis it must seriously tackle the question of publicity.

Mr. J. B. E. Paterson (Provincial Advisory Chemist, N.A.A.S., Bristol) said that experiments had been carried out over a wide area by the Ministry of Agriculture; they would soon be going through all the results and getting some really useful information. He confirmed that gas liquor could be put down very early in the year without loss of nitrogen; also, that it could usefully be applied to the seed bed just before drilling kale.

Mr. M. N. Nicholson (Provincial Advisory Chemist, Reading) emphasized the need for a standard product, free from noxious acids. In his area they had conducted experiments on kale with a special machine for injecting concentrated liquor beneath the surface, using sulphate of ammonia as the control. His opinion was that if the gas industry wished to promote the use of more gas liquor in competition with sulphate of ammonia the price must be reduced a little. He was inclined to favour the use of concentrated liquor by injection.

Mr. J. E. Jones (South Eastern Gas Board) observed that with the latest increase of about £2 per ton in the price of sulphate of ammonia there must be big advantages in the use of gas liquor from works in rural areas. But it was still expensive, and they could not yet say what the long-term effect on the soil would be. He pointed out that the East Greenwich works were at least 10 miles from the nearest green field, and here and at other big urban works he thought that concentration plants might be a better proposition. The gas industry did, in fact, produce a considerable amount of sulphate of ammonia; a total of some 300 tons a day had been reached at East Greenwich. Moreover, the peaks of liquor production did not always coincide with the peaks of farmers' requirements—and it was easier to store sulphate than liquor.

Mr. Jenkins, a farmer from Sussex, enquired how long one application of gas liquor lasted, and had the author any experience of applying the liquor by means of irrigation equipment? He wondered why they relied on gravity feed as he would have thought that controlled pressure within the tank would ensure a constant feed through the spraybar.

Mr. Tunstall (Eastern Gas Board) mentioned some interesting experiments at Tottenham on an ordinary allotment, growing vegetables and soft fruit, with a view to determining whether there were any lasting toxic effects. The liquor was the only form of nitrogen applied, and after 20 years there was no diminution in either the quality or the quantity of the crops; nor was there any evidence of deterioration in the texture of the soil.

Mr. Smith (Eastern Gas Board) said that from some of the smaller works in particular he would expect higher thiocyanate figures and asked what was the upper limit which would leave residual effects.

Dr. Braunholtz (Secretary, Institution of Gas Engineers) suggested that the thiocyanates and phenols in the liquor might well have a beneficial effect in destroying plant pests.

Mr. Mead (North Thames Gas Board) asked if there was much profit from the operation of this scheme. He suggested that the relay tank should be made of P.V.C. self-erecting by air pressure.

Author's Reply

Mr. H. M. Lawrence said that they had frequently sprayed liquor on frosty ground, and so far as he could ascertain it was just as effective. From the point of view of the machines it was better since the ground was harder and therefore easier to move on. As regards combining liquor with selective weed-killer, they had considered this, but with the time and facilities at their immediate disposal they had not yet had a chance of discovering whether there was any inter-action between the constituents of the liquor and the weed-killer.

He welcomed Mr. Paterson's statement that results of trials over a wide area would soon be forthcoming, and he thanked Mr. Paterson for all his help and encouragement up to now. As far as the price to the farmer was concerned, operating as they were at the moment, with the tackle available, it was quite impossible to reduce the charge; they were working to a very fine margin.

In reply to Mr. Jones, the author pointed out that in no way did he suggest that ammoniacal liquor should supplant gas-works sulphate. They were complementary to each other, and there would be plenty of room for both for a long time to come.

Replying to Mr. Jenkins, he said that he did not think the exact amount applied to the ground was so critical that it mattered a great deal, although he was open to correction on this. One of the very reasons for his proposed new layout of the trailer was to allow the tank to be lowered or raised by hydraulic rams operated from the hydraulic lift mechanism of the tractor, thus keeping the head of liquor to the spraybar steady. He had no experience of the use of irrigation equipment, though he had given a great deal of thought to the matter in the early days. In a large field the amount of hose required would be out of the question, and, in any case, special hose made of polythene would probably be required.

He was very glad to hear Mr. Tunstall's comments on the question of long-term effects. To Mr. Smith he said that retort liquor from small country works might leave undesirable effects, but he thought they would be only temporary. Although they tried to work all the time on washer liquor, it was possible that they might occasionally have retort house liquor; but no really bad results had been noticed. He suspected that one of the complaints referred to in the paper was due to this; but again the effects were only temporary.

As regards profit he had already mentioned in reply to another speaker that they were working to a very fine margin; but generally speaking it was very slightly on the plus side after inclusion of all overheads. He thanked Mr. Mead for his valuable suggestion as to P.V.C. tanks.

On Saturday Britain's miners rounded off the traditional pre-Christmas 'bull' week with an all-out effort on the voluntary shift. Early estimates indicate that last week's production will be about 100,000 tons up on the previous week but about 50,000 tons down on the 'bull' week last year, but this has been achieved with fewer men in the pits.

15

COMPLETE GASIFICATION PLANTS (GAS INTEGRALE SYSTEM) NOW IN OPERATION* OR UNDER CONSTRUCTION†

	Number of Units	Millions cu.ft/day
* COMO	1	0.5
* DIJON	2	2.8
† FREIBURG	2	2.8
† GLOUCESTER	1	2.5
* LONDON (KENSAL GREEN)	1	2.5
* MILAN	1	3.5
* MILAN	1	1.4
* NAPLES	2	4.2
* ROME	4	8.5
† ROME	1	2.5
* LA SPEZIA	1	1.4
† TOKYO	5	21.0
* TRIESTE	2	4.2
* ULM	1	0.8
* VIERZON	2	2.1

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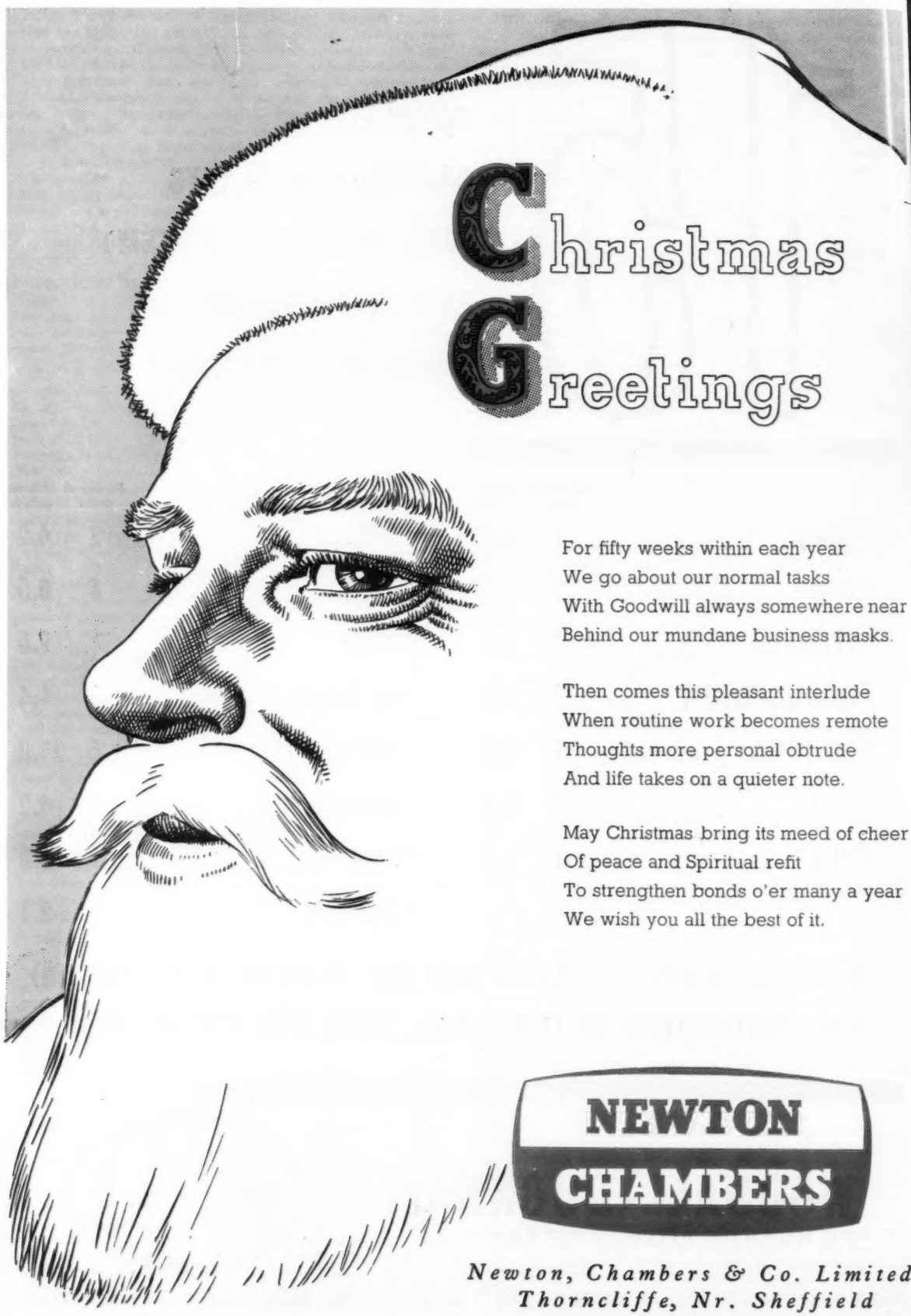

Christmas Greetings

For fifty weeks within each year
We go about our normal tasks
With Goodwill always somewhere near
Behind our mundane business masks.

Then comes this pleasant interlude
When routine work becomes remote
Thoughts more personal obtrude
And life takes on a quieter note.

May Christmas bring its meed of cheer
Of peace and Spiritual refit
To strengthen bonds o'er many a year
We wish you all the best of it.

NEWTON CHAMBERS

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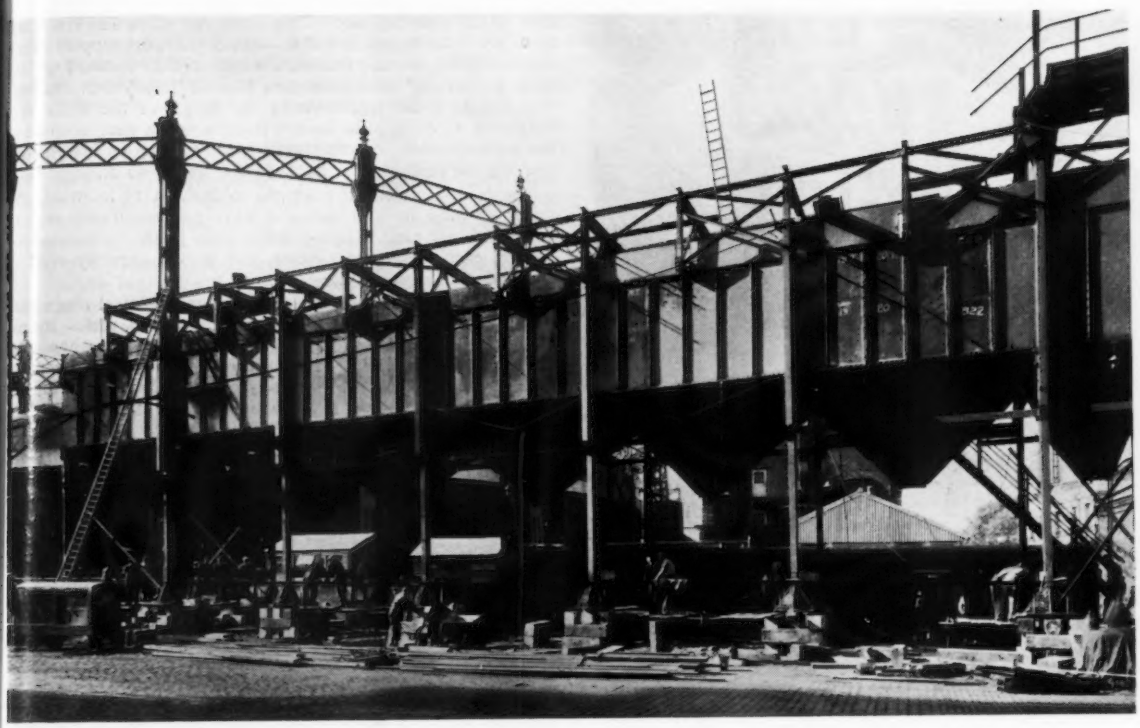

To facilitate mechanical handling of coke these bunkers at Fulham were lifted 4 ft. 3 in.

Materials Handling Plant for Gasworks*

By F. R. WAPLE†

IN this paper is introduced the 'blanket' conveyor which has been developed for the purpose of extending the usefulness of the conventional type of belt conveyor by making it possible substantially to increase the angle of incline up which loose granular materials may be raised. Should this conveyor prove fully satisfactory, it will open up a wide new range of thought to the handling engineer and will have useful applications in many fields.

The original idea, developed by the author, was that a 'blanket' belt resting on the material on the carrying belt was the main feature. The reasoning used was that, provided there is no disturbance of the material, the belt is in fact an inclined rubber trough, and the materials would run down at the recognized angle of slope. This angle for graded coke would be about 28°, and the reason for the present maximum angle of 16° to 18° is that the coke receives a jolt at each supporting idler which might be sufficient to disturb its rest and cause run back, especially where the feed is intermittent and the material is not backed up as in a continuous stream. It was felt that the top belt would blanket this motion, and the first experiments were carried out at what was considered a probable maximum of 35°.

The next point to be considered was how to get the coke discharging down a chute on to the conveyor to settle down on the carrying belt. Various ideas were tried out on the drawing board, with retarders and scoops and different plate arrangements, until the simple device of feeding at the recognized angles and then gradually rising on a curve was felt to be the solution. The trial plant was roughly built up of tubular supports and a miscellaneous collection of existing idlers and wooden top rollers on fixed pins. The radius of the curve at 100 ft., and the 6 H.P. of the motor were designed to suit a rate of 45 to 50 tons per hour. There was no suitable feeder available, and so a dump hopper was fitted at the feed end and the material allowed to discharge at an uncontrolled rate which averaged out at 47 tons per hour when handling small and medium sized coke up to 3 in. cube. The belt width was 24 in. and the blanket belt of the same width, both of 4-ply construction. The top belt was in no way special, and was in fact a worn belt destined for scrapping. On the first run there were no top idlers sealing the belt edges and there was some spillage, but the bulk of the coke was raised to the top. A second run was made after top edge sealing rollers had been fitted—one after every third troughing idler and in a central position between them—the carrying idlers being slightly closer pitched than usual for this size of belt. This run and those which followed were all satisfactory, small coke, 2 in.-3 in. size and on one run 6 in. to 8 in. size coal, was carried up without difficulty. In addition some isolated lumps of coal of up to 14 in.-16 in. cube were carried up as was also mixed coal from dust up to 6 in. size off the coal heap.

Following these trials, it was decided by the Board to place on order a conveyor to satisfy the conditions required for a plant at Bow Common, which conditions are almost exactly similar to those used in the trial. It was decided in view of the still experimental nature of the conveyor to make allowances for adjustment wherever possible. Consequently the top edge sealing rollers are designed for movement in all directions, *i.e.*—across the conveyor vertically above the belt, and in angularity to the belt in the vertical plane. Furthermore, the conveyor supporting steelwork is made wide enough to accommodate a belt 6 in. wider should this be found necessary.

Following the trials on the mock up plant, which initiated the patenting of the idea, and the full scale plant at Bow

* From a paper delivered to the London and Southern Junior Gas Association on December 9.

† Engineer Designer, North Thames Gas Board.

Fig. 1.—Blanket conveyor at Bow Common. The lower conveyor is at the conventional maximum angle of 16°.

Common, the trial plant was modified to an angle of 45°, the curved section remaining at 100 ft. radius and the same 6 h.p. motor used. It was appreciated that the motor power should be increased due to the greater lift, but as this plant was of an experimental and temporary nature, major alterations were not justified. Test runs were made with large coke, smaller coke, and 0 in.-6 in. size coal. The first run was successful in elevating the coke without spillage, but the feed rate was unsatisfactory because the large coke did not flow regularly from the feed hopper. Test No. 2 was encouraging, but at one time the blanket belt ran off to one side and became jammed. After this fault was corrected the remainder of the small coke was successfully elevated. The chief cause of this failure was undoubtedly due to the fact that the small coke coming from an uncontrolled feed flooded the conveyor. The trial with coal was not satisfactory chiefly because the motor was overloaded and stalled, and the belt did not track properly in the steep section. However, the impressions gained from the trials were that an angle of 45° would be possible on some grades and types of material but that the limit is being approached, and further tests would be necessary before satisfactory operation could be assured. No doubt the ultimate limits will only be found over the years with small advances at each stage. It may be that the nature of the blanket belt itself will have a decided influence, especially at the steeper angles, and developments on this will continue.

A Coal Handling Plant

At the North Thames Beckton station a high capacity coal plant is being installed and has some unusual features of design.

One plant involves a new pier for berthing colliers of about 4,500 tons coal capacity which will be unloaded by four 10 ton electric jib cranes of the 'Kangaroo' type which travel over the length of the pier. Only three of the cranes are needed to discharge the ship. Each crane has a maximum discharging rate of 300 plus tons per hour so that an overall maximum rate of something over 900 tons per hour can be expected and a ship will be totally discharged in about 7 to 7½ hours. The cranes deliver by means of apron type feeders to a 48 in. wide conveyor, which in turn delivers to an inshore conveyor 54 in. wide. The latter conveyor has a capacity of 1,600 tons per hour enabling it to take, in addition to the coal from the new pier, coal also unloaded simultaneously from the lower arm of an existing pier. This conveyor spans the river and has an overall length of 410 ft. with a mid-span support in the river. Having arrived inshore the coal can go forward to feed onto a conveyor over a stocking field of 75,000 tons capacity. The throw-off carriage covering the length of the shore at a height of 45 ft. is rope hauled from a winch gear situated at the outward end. The coal store is 370 ft. long by 320 ft. wide and the maximum stocking height is about 40 ft.

The coal is reclaimed from the stock by a 54 in. wide conveyor situated in a tunnel and having a maximum rate of 1,600 tons per hour. This is fed at four points by apron type feeders each having two speeds and with a capacity each of 200 and 400 tons per hour.

An apron type feeder consists of an endless steel chain over toothed sprockets to which is fitted mild steel plates shaped along the leading edge to cover the preceding plate when passing round the sprocket. The speed of the chain and the cross-sectional area of the moving body of coal governs the rate of feed. When large-size lumps are likely to be encountered a heavy hinged curtain of plates at the feed-on point has been found to give satisfactory control. There are of course other types of feeders such as the rubber belt, the jigging 'sure' feeder, the 'Locker' or Sherwen vibrating type and others, all of which have their particular uses and all of which should be considered in relation to the local circumstances and the work to be done. The apron type was chosen for this particular duty at Beckton because of its sturdy construction and reliability bearing in mind also that the coal pressure on the carrying table may be considerable and that the coal to be handled will vary in moisture content and also in size.

To spread the coal and bring it back to the reclaiming points a number of bull-dozers will be used. This method of stock-piling and reclaiming is in accordance with the present day trend of reducing the cost and the amount of capital plant for making stocking fields. To hold 75,000 tons on this size of field requires a stocking height of 40 ft., and with the use of bull-dozers putting the coal out in shallow layers and with the consolidation of the coal in doing so, it is found that this can safely be achieved. The risk of fire is eliminated by the compacted state of the heap. Unless there is complete confidence in this fact, the making of a stock to this height and by these means is indeed a risky business as the digging out of a fire is extremely difficult, perhaps impossible.

It is found that a large bull-dozer will move about 200 tons per hour over a 200 ft. haul and it is estimated that four of these machines will be sufficient to maintain a satisfactory reclaiming rate under normal conditions. The coal so reclaimed on to the tunnel conveyor, beside being taken to works services.

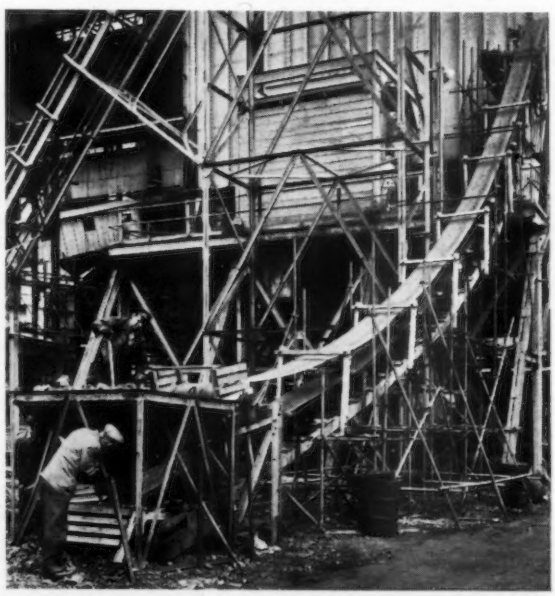

Fig. 2.—The blanket conveyor trial plant.

can be returned to the new pier for filling barges. The conveyor returning this coal across the river is carried in the same gantry as the incoming conveyor and is directly underneath it. Arriving at the pier another conveyor along the pier at floor level delivers the coal to a barge loading machine.

Coke Loading Plant Modification

At the Fulham station of the North Thames Gas Board there is a set of steel coke bunkers, installed many years ago, which were undoubtedly adequate for the needs of the time when the treatment and sale of coke was vastly different from present requirements. These bunkers were set low to the ground making it impossible to use the double step loading and mechanical debreezing required today. This arrangement created arduous working conditions for the coke loader and it was clearly desirable to effect some improvement. As the retort house was

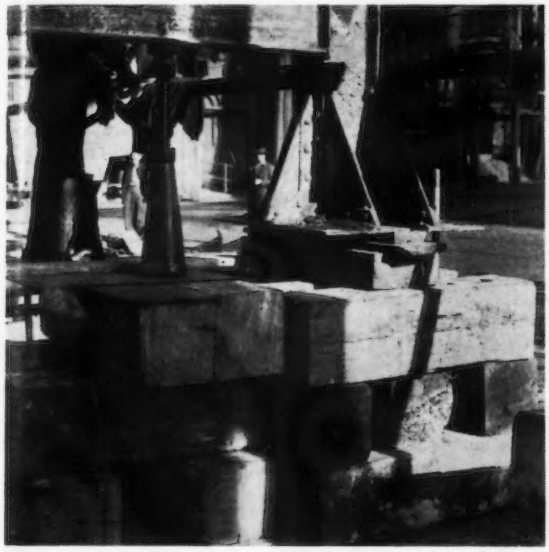

Fig. 3.—Lifting bunkers at Fulham. An enlarged view of jacking position.

down for resetting an opportunity presented itself of carrying out the necessary changes, but there was nothing which could be done effectively apart from lifting the bunkers up bodily to give the required height. Time was short but it was decided to undertake this tricky operation and reconstruct the plant.

The first stage necessitated the temporary support of the existing inclined drag bar conveyor, and the stripping down and removal of all plant above the bunker. The second stage was to repair and strengthen the bunkers and prepare the ground.

The third stage was the lifting of the bunkers and the following procedure was adopted. The bunker legs were tied by longitudinal members and diagonal bracing in the longitudinal plane fitted in one bay at each end, and rope guys with chain tackle for adjustment were secured to each bunker column.

Having prepared the bunkers, a stack of timber to the required sizes was placed alongside each base ready for packing the jacks and the columns to the full height of lift 4 ft. 3 in. An operating platform was built alongside each jack. Two men operated each guy rope tackle. Two men supervised the operation of the jacks, and one man signalled each operation by whistle. On the signal being given two men made a half turn on each screw jack equalling $\frac{5}{16}$ in. lift. The packing under the stanchions was corrected after each lift. After lifting two ft. on the first day, the holding down bolts were extended by using ferrules to enable the columns to be anchored. On the second day a further lift of 2 ft. 3 in. completed the lift. Following this the formwork was made for two bases at a time and a 4.2.1 Ciment Fondu mix was used to form a new base.

Coke Screening Plant

By-and-large the screening methods used have fallen into two systems, namely, the balanced reciprocating screen and the short high speed vibrating screen. A high standard of mechanical efficiency has been established for both types and careful balancing and specially designed bearings and other devices have, with the development of easily changed screen cloths, produced machines which are as easy to maintain as one can expect to find in the business of coke screening. Before deciding which system of screens to use one must consider local requirements, the distribution of the sizes, the quantities to be handled, and the make up of the coke, etc.

In general the conveyor screen has been employed where smaller quantities are handled, and the short screen system where the through-put has been large. This may be due to the fact that where large tonnages are handled conveyors are used for distribution into the bunkers especially when requirements vary such as when cutting is required, and the short screen is best suited to belt distribution. When coke is wet and dirty there is difficulty in extracting the smaller sizes on the conveyor screen which is less lively than the vibratory type and has not the advantage of working on a sloping angle. Where through-put is large this can be a serious difficulty. The conveyor screen generally requires a smaller and simpler building or housing than the short screen. There is a growing opinion that the breakage of coke on the conveyor screen is less than when passing through the connecting chutes and conveyors of the short screen system and that there is less dust nuisance. The less costly building and the possible reduction in maintenance coupled with the increasing difficulty of finding suitable labour for maintenance work may induce a trend toward the conveyor screen. On the other hand it must be remembered that, if the collection of dust in screening plants is to become more general, this can be more easily achieved on the short screen. These thoughts may be helpful, but the choice is not easy to make and each case must be considered carefully.

With the increasing need to preserve the coke in the graded size anti-breakage chutes in bunkers may be more often used, especially in cases where the bunkers are frequently emptied. Where these chutes are used they should be lined with blue brick or basalt tiles and be of heavy construction, otherwise their life will be short and they will be a continual cause of annoyance and cost. Maintenance in the grading plant is one of the big worries and a great deal of attention should be given to this in the design stages. All parts subject to heavy wear should be made easily replaceable and everything possible done to give the maintenance staff freedom of movement and the means of lifting worn and new parts out of, and into, position.

Coke Stocking

The making of stock heaps on the ground represents a considerable part of the handling of coke on a gasworks and as such requires full consideration. The trend in recent years has been to employ road wagons to make up the heaps. It has been found that lorries running up a specially prepared ramp of say breeze or earth, do not, when moving over the main coke heap degrade the coke size to any significant extent, and it would seem that this method is the cheapest and most flexible available. It is found that the average cost of handling by this method is about 2s. 3d. per ton using hired plant.

A mechanical plant handling say 20,000 tons of coke a year has been found to cost about 9d. per ton—handled for power and maintenance excluding capital cost and interest. Using lorries at 2s. 3d. per ton to handle this quantity represents £2,250 per annum plus say £500 for maintenance of roads = £2,750. The capital cost of mechanical plant for a similar duty would be not less than £60,000, and assuming deterioration over 30 years and interest at 5% this represents at a handling cost of 9d. per ton, a sum of £5,750 per annum. The difference in cost represents 3s. per ton. It is undoubtedly worth something to have the more precise and cleaner mechanical method where the stocking out conveyor delivers the material gently to stock preventing degradation and segregation, as is very efficiently done with the machine which is in operation at the Kensal Green works of the North Thames Gas Board. It would appear from all this, that only in very favourable cases can the additional cost of mechanical handling to stock be justified.

In many cases the coke grading plant is superimposed on coke bunkers. Where concrete bunkers are used it is advisable to end the concrete construction at bunker top level leaving the screening house in a form of construction more easily suitable for accommodating any changes which may be required. Reinforced concrete construction of the bunkers for anything

above the smaller sizes has advantages, and where they are lined with a hard wearing brick and have ample cover over the re-inforcement both inside and outside a very long life with little maintenance may be expected. The design of concrete coke bunkers and other aspects of concrete structures in gas-works is dealt with in an article by S. V. Gardner in the *Reinforced Concrete Review*, Volume 3, No. 9, 1955. At points where the coke leaves the bunker a cast iron mouthpiece is usually inserted and this is also lined on bottom and sides with a replaceable wearing plate. The wear on these plates should be carefully watched so that the main body of the casting remains undamaged. The inside of the bunkers should be as clean as possible and corner angles should be not less than 40°. Even at this slope the coke will hold up and pockets of breeze form but greater angles lead to rather extravagant heights and it is better generally to rely on the de-breezing screens to remove the abnormal amount of breeze which comes down when the dust pocket collapses. Where steel bunkers are used they should be lined on the sloping faces with brick cemented in and the vertical faces should also be protected in this way where there is constant abrasion.

Dust Extraction Plant

Because of the greater appreciation of the need to employ amenities, particularly in coke screening plant on larger installations, the provision of standby plant and dust collection units is increasing. The provision of dust collection plant is a costly business but more of them will undoubtedly become necessary especially in cases where the plant is situated in a built up area.

One of the difficulties of fitting dust extraction plant over screens is the need for close fitting hoods. A running track over the screens and quick release attachments to the offtake pipes are things for which room should be found. There are two methods of dust collection—wet and dry. Where the dust has some value and reclamation is desirable the dry method has its advantages but speaking generally wet collection is favoured. Trouble is experienced in dry collection, especially when bag filters are used, because of the high rate of expendibility of the bags, maintenance of bag shaking gear and the difficulty of disposing of the final dust product. Dust extraction through water screens is finding favour and experience shows that the extractor or wash box has a fairly long life and day-to-day maintenance is not heavy. One must not overlook the need to pass the contaminated water drained from the sludge through a filter before passing on to drains. In the interests of power economy and trouble free working the trunking should be made as short and free from bends as possible and there should always be a margin of power in the motor. Too little power means failure, too much power only means adjustment, and there is always an additional point somewhere from which collection is desirable.

Cleaning of coke is sometimes associated with dust plant in as much as the dust collection from the screens can also handle the dust collected from the cleaning plant. Cleaning by water processes is giving way to the dry method where the coke in suspension in air moves along to the clean discharge point while the unwanted heavier shale and bats drop on to a vibrating plate and are removed from the clean coke. In the North Thames Gas Board area it is usual to clean only the 'nuts' size coke and this is efficiently carried out. It is probable that with cleaner coal coming into the works less cleaning will be necessary in the future, but the present increasing price for coke fuel may for a time increase the need to produce a properly prepared product—to withstand the closer scrutiny of the buyer.

Electrical Control Gear

In cases where the control gear is sited in a position adjacent to working plant it should be housed in a building specially constructed to exclude dust and prevent vibration. It is the North Thames Board's practice to have audible warning alarms in all cases where the operator cannot see the whole plant. Where there are long conveyor runs it is sometimes arranged to interlock the system through centrifugal-type switches driven by the belt, to save cable work. Time relays are arranged to enable each motor to run up to speed before the next motor starts. Conversely, time delays are provided on stopping to allow conveyors, cutters, etc., to get clear of material before stopping. On large installations it is not unusual to have a mimic display board which shows, by lights or in diagrammatic form, the process of starting up, but it is not often that this refinement is required on a gas-works because the extent and complexity of the plant does not justify the cost. No attempt is made here to describe in detail the electrical plant, but an efficient trouble free system with all components designed for hard wearing conditions is essential, and safety in operation of primary importance.

DISCUSSION

Mr. L. J. Clark, North Thames Gas Board, said he felt on looking back over transactions of the Association, the Institution, and Sections of the Institutions, that not enough attention had been paid to the subject of materials handling. The biggest factor in costs today was always the increasing cost of labour and the only way it could effectively be combatted and productivity increased was by more effective use of that labour—by better handling of materials. He hoped that they should see other papers dealing with the subject. For instance, the importance of it was such that, if they took Beckton works, they found that there was over 10,000 h.p. installed for motors in driving mechanical handling plant. That did not necessarily compare with American practice. There was still a long way to go. The costs associated with mechanical handling were also very high. The power consumed was something of the order of 5% of production costs on the works. The subject deserved a lot of attention from the point of view of design. The main theme of Mr. Waple's paper was, of course, the blanket conveyor, and here he thought it was the most admirable example of what one might almost call operational research. Mr. Waple had been faced with a problem to solve. He had considered it from, first the theoretical viewpoint, developed it from the design stage and experimental stage and finally had produced a really practical job, the first installation of which has now been working successfully for the best part of two months.

Mr. Clark said that in suggesting that much more attention should be given to mechanical handling, he was not saying that they should take materials round the works for a ride. A description of some old plants had shown that materials had indeed gone up and down the gasworks unnecessarily. They had to start with some of those problems right back at the works, and to make sure that plant 'A' was in the right relationship to plant 'B.'

The author had spoken about the development and use of proper equipment for handling coal and the advantages from the point of view of cost. But they had to make sure they were using this equipment to the best of its ability—designed for their own particular problems. Mr. Waple had referred to the bull-dozing of coal. They had carried out a lot of operational research on this and had concluded that it was a fairly safe operation. Even if fire did occur they were satisfied that it could be dealt with. But on the subject of the bulldozer on that kind of job, was it being used to the best advantage? On his works they were experimenting with a bull-dozer half the power of the one they had used hitherto. They found this machine moved more than the larger machine.

On coke screening, Mr. Clark said they had by no means arrived at a stage of satisfactory design in the screens. They still got more complaints from their customers than they should and if they were going to maintain the price they were asking they must see that the product was efficiently dealt with.

The final subject Mr. Clark dealt with was automation. They were always trying to get over the manual operations, but it was wrong to overdo it. Basically it was necessary to save manual working, but if they took the loading of coke-sacks, for example, it was still of necessity a manual operation to hold the sack while it was being weighed and filled. He had had this point forcibly brought home when in a big French works he saw a large plant for the complete weighing and loading of sacks into the lorry. It was much too slow. When he inquired lately into the fate of the plant he found it had been dismantled because of this slowness of working.

Mr. L. Smith, North Thames Gas Board, asked what happened in the event of foreign matter getting into the cross-

section of the blanket conveyor? He was thinking in terms of large pieces of carbon or other matter which often got into the stock heaps. Also, in the event of the belt conveyor slipping on the head-drum with consequent overloading on the tail end of the conveyor, what happened with obvious overloading of the cross-section of the blanket conveyor? Thirdly, what happened from a maintenance point of view when the conveyor joint clips become badly worn. How was that particular job handled if half the clips needed renewing? It seemed to him that the conveyor idlers should be maintained satisfactorily.

Mr. Waple had referred to the importance of putting blue brick or basalt tiles on chutes. Mr. Smith said he was sure they would all agree that was most important wherever possible.

Mr. G. F. Roberts, North Thames Gas Board, asked what happened if the belt broke down under the load. Basalt tiles as a lining material for chutes had been successfully used at Kensal Green and they seemed very much superior to any of the other materials in resisting corrosion.

Mr. A. J. S. Wiseman, North Thames Gas Board, said Bow Common was chosen for the first production model of the blanket conveyor. He would answer Mr. Leslie Smith's question by saying that so far there had been no serious inclusion of foreign matter so there could be no answer for the present. There did not seem to be any serious slipping of the conveyor. They felt there was definitely less spillage. Mechanically, as he had indicated, the belt in its so far short life had shown no trouble; there had been no riding-off of the upper belt. He did not know that a great deal of breakage occurred, but this blanket had completely prevented any slipping back and might in that way have made even smaller the amount of breakage which might take place. The major point was that this conveyor, as used on Bow Common works, was receiving coke being discharged from vertical retorts at the rate of 33 tons in 1¼ hours, but not smoothly, rather in fits and starts. There was probably a maximum of 40 tons an hour.

The great advantage of the conveyor could be seen at a glance at the present moment while the old and the new conveyors were side by side. This was that it lifted the coke to almost double the height in the same distance, which would be an advantage with the new screening which was envisaged.

Mr. Mortimer, North Thames Gas Board, asked what the behaviour of the conveyor was in a very high wind.

Mr. J. D. Grant, North Thames Gas Board, said he would like to be clear whether the stocks of coal at Beckton were allowed to be run out or were left in the original stacking in view of the effect of bulldozing 24 ft. heaps of coal and the consequent effect—general hardness and obstinacy of the coal to move when it came to reclaiming it.

Mr. Clark, W. J. Jenkins & Co., Ltd., said it would be a good thing for idler design if the users got together to decide what they liked.

Mr. White, North Thames Gas Board, asked the possibility of using the blanket conveyor for oxide.

Dr. A. E. Haffner, North Thames Gas Board, said he saw no harm in pointing out that the lifting of the coke ovens was carried out by the Demolition & Construction Co., Ltd. They had carried it out with an orderly and safe procedure.

Mr. Waple replied. He said they never had slipping belts, and so far there had been no indication that the carrying belt came into contact with anything which would wear it. On the question of chute wear, Mr. Waple said it might well be that if all the interested people could get together and have a trial plant tried and tested over the years, they might find some other substance which would give a long life. About the behaviour of the conveyor in a high wind, the author said he could say that on the mock-up plant at Southall there was no trouble in high wind, and on two or three occasions it was blowing a gale. On the handling of oxide on the conveyor, Mr. Waple said he would say that oxide would handle better on a blanket conveyor than most other materials.

Mr. J. B. McKean, South Eastern Gas Board, proposed a vote of thanks to the author.

Britain's Energy Prospects

'BRITAIN'S Energy Prospects' is the title of 1955's Viscount Nuffield Paper presented to the Institution of Production Engineers by Dr. G. H. Daniel, Ministry of Fuel and Power. The following is an abstract of the paper:

To assess the possible course of demand for each of the main fuels, the prospects in the principal consuming sectors must be examined but, before we do so, a few general considerations affecting the relative attractiveness of these fuels are worth noting. Of the two primary fuels on which Britain is mainly dependent, oil has overwhelming advantages for transport uses as the result of the inefficiency of the mobile steam engine, the development of the internal combustion engine and the gas turbine, and the convenience with which high energy liquid fuels can be carried. In most other applications (almost the only exception favouring coal being the production of metallurgical coke) the two fuels can be substituted for each other. In most of the important industrial applications a ton of fuel oil will do the work of between 1½ and 3 tons of coal, these figures allowing both for the difference in thermal content and the greater flexibility of oil and the improvement it yields in rate and quality of output. There are also important labour savings in favour of oil. At the lower end of the replacement range are big steam-raising installations like those of central power stations; in the middle are smaller steam and hot water boilers such as those used for central heating and also brick and pottery kilns, open hearth and reheating furnaces; at the top end of the range (oil replacing 3 tons and more of coal) are special furnace applications like heat treatment, forging and nut and bolt furnaces. Thus where regular supplies of fuel oil can be provided at a cost of not more than about three times that of coal there is an economic incentive to use it, and where the price ratio falls below two this incentive is very strong.

The two main secondary fuels are in a somewhat similar position *vis-à-vis* each other as the two primary fuels, the tide of fortune flowing much more strongly in favour of electricity than of gas. Many of the advantages that gas has over coal in flexibility, ease of control and cleanliness are shared by oil and electricity, and the trend of prices has been in the latter's favour. The strength of the position held by electricity is one of the dominating features in the fuel market. For lighting and power it has been supreme since the beginning of the century. For lighting it has the advantages of ease of control and of being several times cheaper than any other form of lighting. For power production the big economies in generating cost that follow from an increase in the size of power stations make it much cheaper for almost every consumer to buy electricity from the public supply than to generate his own power. Only in a comparatively small number of cases, where a firm has waste fuel such as blast furnace gas or wood waste or can profitably install a back-pressure set for combined production of heat and power or has a very big power demand at a high load factor, does it pay industry today to have its own prime movers.

As a source of heat, electricity starts with the initial heavy disadvantage that the greater part of the energy in the primary fuel is necessarily lost in the process of generation but the accuracy, flexibility and efficiency with which it can be applied and the resulting advantages in labour and materials saving and improved rate of output is sufficient in a large number of applications to offset this. Increasing use is made of electric furnaces in industry; the induction heating furnace deals with steel billets in a fraction of the time needed by ordinary furnaces; infra-red heating reduces the drying time of pottery from a matter of many hours to one of minutes. Even for the comparatively crude tasks of domestic heating, the extra costs of the all-electric house are small and increasingly regarded as justified by the savings in labour and greater convenience. A factor of significance is that the expansion of electricity consumption is inseparably connected with developments in the forefront of technical progress (electronic and ultra-sonics to mention only two).

The Customer Sees What's Cooking

Rising Popularity of Bacon and Eggs

With the gradual development of gas-fired infra-red appliances there is a growing tendency among caterers to exploit the practice of cooking in full view of customers. The advantage of preparing such tasty grills as chops, steaks and even chickens in this way have long been acknowledged by caterers and are certainly appreciated by the public generally. An outstanding example of the popularity of this vogue is the 'Bacon and Egg' bar of a famous London restaurant. Here are two more examples which have come to our notice and which may appeal to catering managers anxious to improve their canteen services.

At the foot of Richmond Hill facing the bridge approach is a very attractive coffee house called 'L'Auberge,' which has been open for eighteen months. Recently the premises were enlarged and decorated throughout in contemporary style. In two senses the result is pleasing to the eye. The trend to modernity is completed by the serving of bacon and eggs in full view of customers.

The coffee house itself now consists of three separate rooms, each possessing distinctive characteristics. In the room where the cooking is done there are some very fine examples of tiled craftsmanship. The tables are laid with tiles, on which are depicted the produce and dishes of the house. Inlaid on another table is a detailed map in tiles of the River Thames with the position by Richmond of 'L'Auberge' boldly marked. This novel idea sprung from the proprietors, Mr. and Mrs. Michael Hill, and the tiles were made by the Dunsmore Tile Co., of Campden Hill. The cooking of the bacon and eggs—the speciality of the house—is carried out in pans which are then served direct to the customers on wooden platters. The cooking equipment was specially designed and manufactured by the North Thames Gas Board and consists of four commercial boiling burners inserted into a stainless steel frame. The entire effect is clean, efficient and pleasing to the eye.

American Influence

Although situated in Brompton Road, London, the 'Lindy Lou' coffee bar is more American than Continental in title. It is the very latest addition to the many colourful coffee houses and bars and has a good site opposite the front façade of Harrod's stores. In fact, the decor of this coffee house is reminiscent of Frascati's, being in the period style of the late 19th century. Many of the decorations did in fact come from that famous restaurant. There is a touch of the craftsman about the whole place. The crazy-paved floor reflects the most gorgeous hues of Italian marble. Below the elegant staircase is a second coffee bar decorated in Georgian style.

The latest type of 'Espresso' coffee machines are installed in each of the bars, and the speciality of the house is again bacon and eggs; various other tasty snacks are also served. The cooking is carried out in full view of the patrons and the equipment in the Still Room is of the latest kind and created for 'cooking in the public view.'

It consists of a large stainless steel hotplate with the most modern gas burners inserted. On these burners a special stainless steel pan is placed in which the bacon and eggs are cooked. As in the case of 'L'Auberge' the pan is served direct to the customer on a wooden platter, with all the cooking flavours retained and, most important of all, piping hot.

Grilling

Grilling is carried out on a gas infra-red griller fitted alongside the hotplate. Other equipment consists of a gas griddle plate, a gas hot-closet and bain marie, and also an electric counterfry of American manufacture. The main kitchen of this fine establishment is situated downstairs, and the modern equipment installed there comprises a heavy duty double-oven restaurant range, a large baking oven and a solid muffin plate. The dish washing machine is of Hobart manufacture with a gas heated booster plant.

Infra-red

One further point about infra-red. It is a scientific fact that infra-red heat rays do have the power to penetrate absorbent substances such as meat and homogenous foods without the surfaces being baked hard. Nearly all types of grillers give this heat ray in varying degrees, but it must be known that actual contact of the heating medium with the food eliminates the infra-red heat, as the actual source of heat is transferred from radiant to conductive heat, the latter having no infra-red value whatsoever.

It is believed that no one would wish to make extravagant claims for the infra-red process of grilling as being something new; it has been known for years. Most kitchens are equipped with the conventional type of grill or salamander using gas or electricity as the heating medium, and chefs and caterers can, therefore, be assured that in using their appliances they are obtaining the maximum of infra-red heat rays.

DEVELOPMENT OF NUCLEAR ENGINEERING

Ten Years' Progress

At the inaugural meeting of the British Nuclear Energy Conference at the Institution of Civil Engineers, London, Sir Christopher Hinton, Managing Director of the Industrial Group of the United Kingdom Atomic Energy Authority, and Chairman of the Conference, said that in ten years nuclear engineering had so developed that it was an important industry in its own right and by 1975 would involve business in the home market amounting to some £300 mill. a year. Nuclear energy should not be regarded as a completely new technology, but rather as an extention of existing technologies.

We ought to attribute our present satisfactory position in the field of nuclear energy not to our ability to evolve technologies which are completely new or revolutionary, but rather to the ability which has been shown in adapting and developing existing techniques to problems which are completely new.

Lectures which were delivered at the meeting included one by Sir John Cockcroft, who outlined the work of the Research and Industrial Groups of the Atomic Energy Authority. Mr. V. A. Pask (Chief Engineer, Operations Headquarters of the Central Electricity Authority) and Mr. J. C. Duckworth (Nuclear Power Engineer, Operations Headquarters of the Central Electricity Authority) in their lecture considered that by 1980 the number of units required from nuclear fission if the importing of fossil fuel was to be avoided was about the same as that which it was anticipated would be produced from home-produced coal.

The authors showed also that if credit for the plutonium produced was taken into account, the net generation costs from nuclear plant should be very similar to those from the most advanced coal-fired plant planned up to 1962.

New Chrome-Alloying Factory

The Chrome-Alloying Co., Ltd., (Associate Company of Diffusion Alloys, Ltd., London Bridge House, S.E.1), announce that they are now fully installed in their new Works at Birchwood Industrial Estate, Hatfield.

The firm operate a patented process whereby chromium is diffused into mild steel for increased resistance to heat, wear and corrosion. The results are, in a large number of instances, comparable to those of stainless, but at a substantially reduced cost. Apart from a wide variety of applications to industry in general, the process is being applied on a continually increasing scale to grill frets, gas pokers, radiants, burner parts, jets and nozzles.

The new factory is a great step forward from the pilot plant which they previously operated in New Eltham, London, and provision has been made for further expansion to meet the growing demand for their process.

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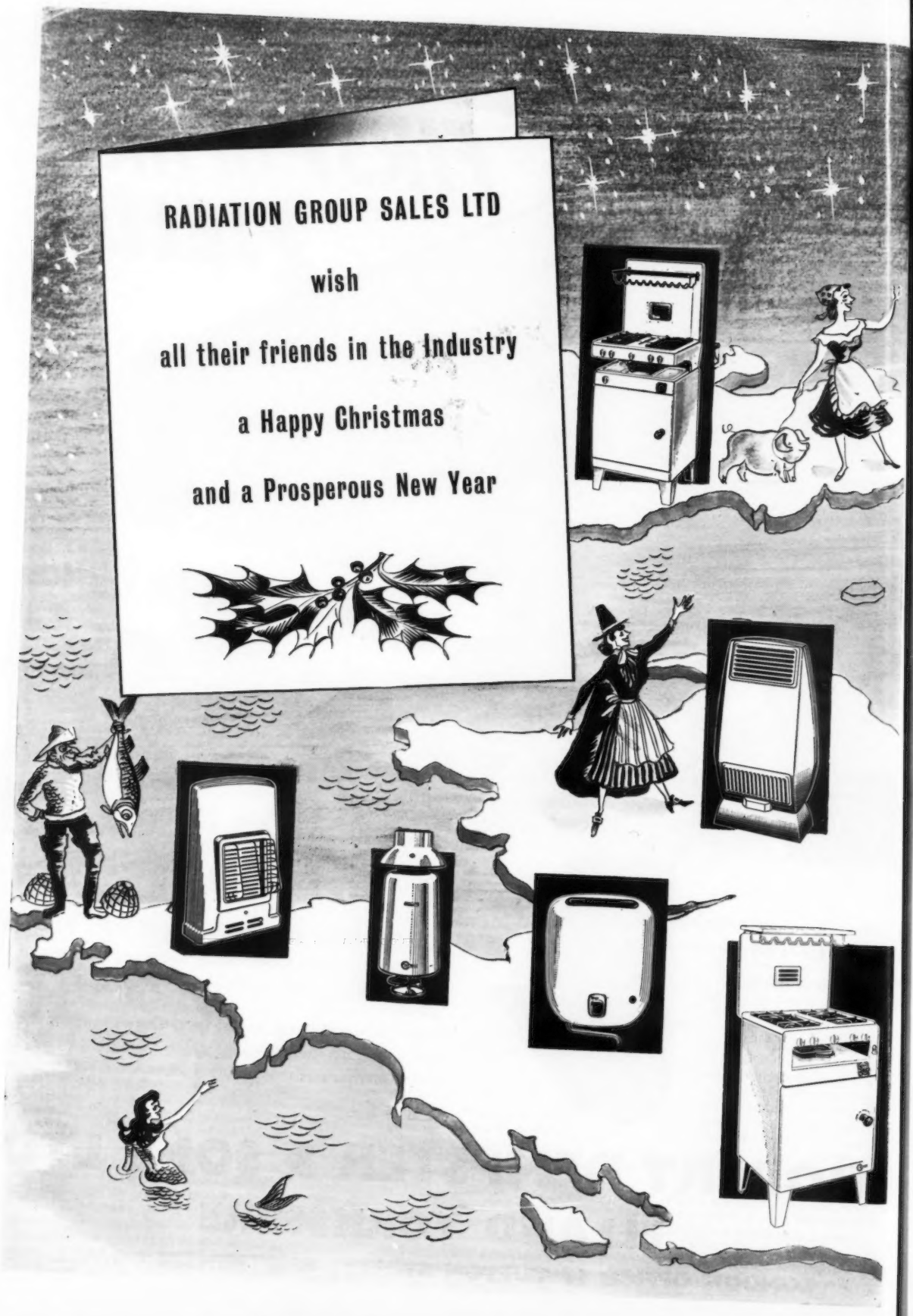
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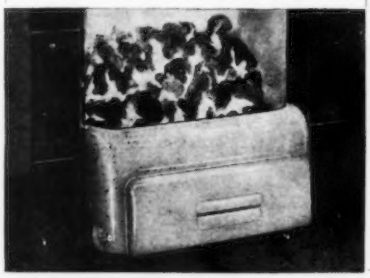

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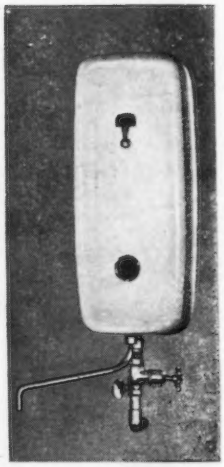

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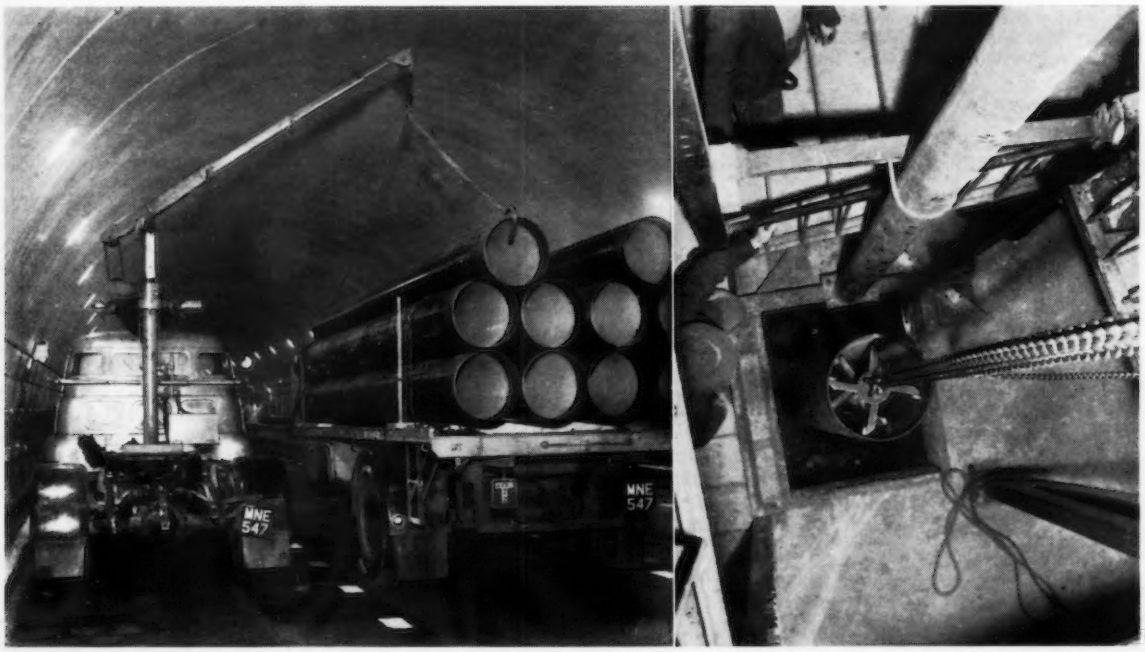
The Story of the Gigantic Task of Laying a Gas Main under the Mersey Tunnel

The painter lying on a trolley inside a length of the 18-in. main. A rope attached to the rear of the trolley pulled him along.

NEARING completion is a project begun some seven months ago by the North Western Gas Board—the laying of an 18-in. all-steel welded gas main beneath the floor of the Mersey Tunnel to connect the gas supply system of the Wirral with the Liverpool system on the other side of the Mersey, and thus with the great Lancashire-Cheshire gas grid, which already links Liverpool with Manchester and at least 50 other industrial centres in the North West. It is claimed that the main is capable of withstanding pressures 200 times greater than it will be required to carry.

Each of the 370 joints, after being welded, was photographed in five sections by gamma-ray photography and joints which showed the slightest flaw were cut out and the welding was done anew. The introduction of the 18 ft. long mains into the bottom of the tunnel offered a task of immense intricacy. They were brought along the tunnel by lorry from Liverpool at night, when traffic had ceased, two-thirds of the way to Birkenhead and negotiated through a small door which would permit their passage into an outer chamber and thence down below the floor of the tunnel. At each end the pipes had to be brought up by twisting passages through the ventilation shafts and out into the streets to be



Left: *The 18-ft. long lengths of main were brought by lorry from Liverpool along the vehicular tunnel between 11 p.m. and 5 a.m. when traffic was at a minimum. They were unloaded by mobile crane and passed through a small door in the side of the tunnel and thence down to the space beneath the tunnel floor.* Right: *A length of main is negotiated through a ventilation shaft.*

A completed length of the main; the plastic cushions which insulate the main from the concrete rests, can clearly be seen.

joined to the Liverpool and Birkenhead mains.

Each length of pipe has been laid on special plastic cushions to insulate it from the concrete bed of the tunnel, and special arrangements have had to be made at each end to provide for expansion and contraction of the 6,580 ft. of main. Normally the main will transmit gas in either direction at pressures of around 5 lb. per sq. in., but all joints have been tested for a minimum pressure of 100 lb. per sq. in., and the welding specialists responsible, who have executed welding contracts on pipelines all over the world, are satisfied that the main will withstand pressures of 1,000 lb. per sq. in. at every joint.

To paint the joints with protective paint on their inside surface, a man armed with paint pot and brush was sent down inside the narrow main on a trolley pulled by a rope. Not only did he not suffer from claustrophobia, he even negotiated without difficulty some nearly right angled bends in the main at both ends of the tunnel where the main is carried up the ventilation shaft.

The project when completed will have cost some £150,000. At the outset it will transmit some 2 mill. cu.ft. of gas daily from the Wirral into the Liverpool area, and two years later this process will be reversed and Liverpool will transmit from 3 mill. to 6 mill. cu.ft. of gas per day into the Wirral when the new carbonizing plant at Garston in the Liverpool system is completed.

The new interlinkage through the Mersey Tunnel is expected to be ready early in February, 1956. Most of the pictures in this article are exclusive.

Motor Vehicle Licences

Nearly 6 mill. motor vehicle licences will expire on December 31, and the work of renewing these began on December 17. The Ministry of Transport and Civil Aviation has appealed to all vehicle owners, who intend to renew their licences, to make their application as soon as possible after that date. By doing so motorists will help to avoid delay in the issuing of their new licences.

Application forms can be obtained from any money order post office and motorists are advised to send them with the appropriate remittance, the registration book and a current certificate of insurance against third party risks by post to the Local Taxation Office wherever possible, and so save themselves time and trouble. Except in the case of goods vehicles and tractors, licences may also be renewed at post offices, provided there is no change in the type of licence required, or in the duty payable.

Humphreys & Glasgow Contract

The North Shore Gas Co., Ltd. of Sydney have awarded to Humphreys & Glasgow Ltd. the contract for a carburetted-water-gas plant at their Oyster Cove Works. The plant has a capacity of 2 mill. cu.ft. per day. It is to be fitted with the Humphreys & Glasgow self-cleaning carburetter to remove carbon deposition when using heavy fuel oils. To allow the greatest flexibility in the operation of the works, it is also designed so that in the future it may be used for the reforming of refinery gases or for the gasification of certain types of coal. For the present the plant will use coke and a distillate oil but the latter may contain some free carbon, deposition of which will be automatically removed in the self-cleaning carburetter.

The plant is provided with automatic clinkering and charging and the working valves are mechanically linked to the automatic operator. The contract includes a brick building with coke storage bunkers and a traversing skip hoist. Provision is made for the addition of two more plants in the future and there is a machinery annexe with sound-proof blower room, pump room and exhauster room. The exhausters are steam driven and the speed is automatically controlled by the height of the compensating holder. The plant will be completed during 1957 and most of the equipment will be shipped from this country.

Another of the Scottish Gas Board's popular cookery demonstrations was held recently in the Large Showroom. Provost John Robertson gave the demonstration a civic send-off. Miss Sheila Sinclair, Home Service Adviser, was assisted by Miss Joyce Forlow. Mr. J. F. Foster, the Large's manager, was in charge.

GEORGE WILSON'S CHILDREN'S PARTY

On December 10, the Coventry factory of George Wilson Gas Meters, Ltd., held their annual Christmas party for 60 children of employees. Father Christmas (Mr. D. C. E. Poole, a Director of the Company) made his appearance at 7 p.m. on a sledge. The function was again organized by the social committee of the firm. The photograph shows a group of children surrounding Mr. Poole.

Manchester Gas and Fuel Engineers Joint Meeting

Fuel engineers and gas engineers put the spotlight on coke at the Joint Meeting held at the Engineers' Club, Manchester, on December 9. Organized by the Manchester and District Section, the Institution of Gas Engineers and the North Western Section, the Institution of Gas Engineers, this meeting was the second of the annual general joint meetings, the hosts on this occasion being the gas engineers.

The chairmen of the respective organizations, Mr. W. S. Hubbard and Mr. A. Harrison Slade, spoke of the usefulness of joint meetings and the value of discussions on problems in which members had a common interest, though perhaps from different points of view. Two papers were presented, (1) 'The Domestic Use of Coke,' by Mrs. E. H. Coley, B.SC., A.M.INST.F. (Radiation, Ltd., (2) 'The Production of Smokeless Fuel,' by Mr. G. E. Foxwell, C.B.E., B.SC.(LOND.), F.INST.E., F.INST.F., M.I.GAS E., M.I.CHEM.E., consulting fuel technologist. We hope to publish an edited version of these papers, together with the discussions which followed their presentation, in an early issue.

Mr. Charles Stirk has completed 28 years' service with the Exmouth branch of the South-Western Gas Board, and a presentation was made to him for his services as one of the Board's drivers.

He received a cheque and a framed certificate of long service. His colleagues gave him a clock. The presentation was made at the works by Mr. H. W. Lock, district engineer and manager.

British Council's 21st Anniversary

The British Council on the occasion of its 21st anniversary has brought out a 120-page booklet to commemorate the event. The publication includes a congratulatory message from the Prime Minister, Sir Anthony Eden, and a review of the twenty-one years of its existence is contributed by Sir Harold Nicolson. Sir David Kelly, chairman of the British Council gives a general survey of the year 1954-55.

Institute of Fuel Freed from Rates

In the House of Lords, before Earl Jowitt, Lord Morton of Henryton, Lord Radcliffe, Lord Tucker, and Lord Cohen, the case of Institute of Fuel v. Morley (Valuation Officer) and another was heard.

Their Lordships allowed the third appeal by the Institute of Fuel, and held that the Institute was a society 'instituted for purposes of science exclusively' within the meaning of section 1 of the Scientific Societies Act, 1843, and accordingly exempted from being assessed or rated in respect of an office and premises occupied by it at 18, Devonshire Street, W.1.

On December 15, 1954, the Court of Appeal (the Master of the Rolls and Lord Justice Birkett, Lord Justice Jenkins dissenting) had dismissed its appeal from decisions of the Local Valuation Court for North West London and the Lands Tribunal.

The Institute was incorporated by Royal Charter on August 12, 1946. Paragraph 7 of the Charter provided: 'The objects and purposes for which the Institute of Fuel is hereby constituted are: (a) To promote, foster, and develop the general advancement of the various branches of fuel technology as an end in itself, and as a means of furthering the more scientific and economic utilization of fuel of all kinds for industrial, commercial, public, agricultural, domestic, transport and/or other purposes, and to promote, assist, finance and support such industrial and scientific research, investigation, and experimental work in the economical treatment and application of fuel as the Institute may consider likely to conduce to those ends, and to the benefit of the community at large. . . . (d) To uphold the status of members of the Institute by holding or prescribing examinations for candidates for election and by requiring standards of knowledge and experience which can be approved.'

GLASGOW COOKERY DEMONSTRATION

Miss Gladys Mann of 'Homes and Gardens' recently gave a series of cookery demonstrations on behalf of the Butter Information Council to members of the Glasgow Evening Citizen Housewives Club. The demonstrations were given at the McLellan Galleries, Sauchiehall Street, Glasgow, to large audiences of housewives, who were most interested in the new features of inner glass oven door and automatic hotplate ignition incorporated in the latest Radiation New World Gas Cooker No. 84G, which was used by Miss Mann for the demonstrations.

MANCHESTER DOMESTIC AND TRADES COLLEGE

A ten unit Grosvenor Central Range has recently been installed at the Manchester Domestic and Trades College, where other items of Radiation large cooking apparatus are already available for students attending an Hotel and Catering Trades Course at the College. This photograph shows the Grosvenor Range, which was supplied through the North Western Gas Board, Manchester Group, who have lent it to the College.

William Dieterichs Memorial Prize

At the Watson House training centre of North Thames Gas Board recently, Mr. Michael Milne-Watson, the Board Chairman presented the 'William Dieterichs' Memorial Prize to three of the Board's apprentices who had each been adjudged the best apprentice in each of last year's three training terms. They were David Hawes (Watson House), John Friday (Stratford) and John Berry (Watson House). Each received from the Chairman a set of drawing instruments. This shield is inscribed with the names of each winner, and is hung for a term at the training centre where the winner receved his initial training. Competition for this award is extremely keen among the apprentices at the Board's three training centres at Fulham, Slough and Stratford.

Opportunity was also taken at this ceremony for Mr. Milne-Watson to present City and Guilds medals, prizes awarded by the Society of British Industries, and special monetary awards given by the Board to three of the Board's employees who, as previously reported, had won top place in the City and Guilds of London Final Grade Examination in Gasfitting (Alan L. May), and the first places in the Intermediate Examination (Messrs. A. Eames and D. Frost). It is of interest to note that Derek Frost, second in the Intermediate Examination, is a previous winner of the 'Dieterichs' Shield.

NEWS IN BRIEF

The telephone number of W. J. Jenkins & Co., Ltd., of Retford, Notts., has been changed to RETford 2231 (6 lines).

Tubela Engineering Co., Ltd., have moved to Fowler Road, Hainault, Essex. Telephone HAInault 4426/8, telegrams and cables, Tubela, Ilford.

Ascot Gas Water Heaters, Ltd., of 255, North Circular Road, Neasden, London, N.W.10, have changed their telephone number to WILlesden 1234.

North Western Gas Board is to endow a laboratory in a new building now being constructed as an extension for Salford Royal Technical College.

The Head Office of the A.P.V. Co., Ltd., has moved to a new building now completed at Crawley. All communications to the Publicity Department should now be addressed to Manor Royal, Crawley, Sussex (Telephone Number: Crawley 1360).

The 75th Edition of the 'Statistical Abstract for the Commonwealth and Sterling Area' has been published for the Board of Trade by Her Majesty's Stationery Office, Kingsway, W.C.2, price 17s. 6d. This publication brings together in the same volume the basic trade statistics of Commonwealth countries up to 1954.

The new South Durham Steel & Iron project recently opened officially by the President of the Board of Trade, for the manufacture of steel pipes has been entirely equipped with welding equipment by Lincoln Electric Company Ltd. One of the first contracts to be secured is a £4,300,000 Canadian order for 75,000 tons of special pipe for transmitting natural gas over 250 miles.

Concerned about two underground explosions which have occurred in King Street, Maidenhead, during the year, the Maidenhead Housing Committee have been in touch with the North Thames Gas Board and the Southern Electricity Board. Both Boards have assured the committee that they are very conscious of the danger of such explosions. It is pointed out that underground services in the street are scheduled for complete relaying, and the work will be started by the Gas Board early next spring.

During November the amount of gas manufactured at Coleraine Borough Council's gas undertaking was 15,129,000 cu.ft.—an increase of 97,200 cu.ft. on the figure for the corresponding period last year. The gas undertaking has been advised that the price of Yorkshire coal will be increased by two shillings per ton and freight rates by ninepence a ton on Ayrshire coal and one shilling a ton on Preston cargoes. The result of the increases will mean that the operating costs at the undertaking will be increased by approximately £900 a year.

The Institute of Municipal Treasurers and Accountants' 'Return of Rate Collection 1954-55' has justbeen published. Prepared every two years, it contains particulars of the arrangements made by authorities for rating owners compulsorily and voluntarily, and shows the proportions of the rate due from owners and paid subject to discount. The Return also gives an analysis of the losses on collection and arrears, the figures being expressed as percentages of the total amount to be collected. All County Boroughs and Metropolitan Boroughs are included in the Return, together with a representative selection of non-County Boroughs, Urban Districts and Rural Districts. Copies may be obtained from the Secretary, 1, Buckingham Place, Westminster, London, S.W.1, price 5s.

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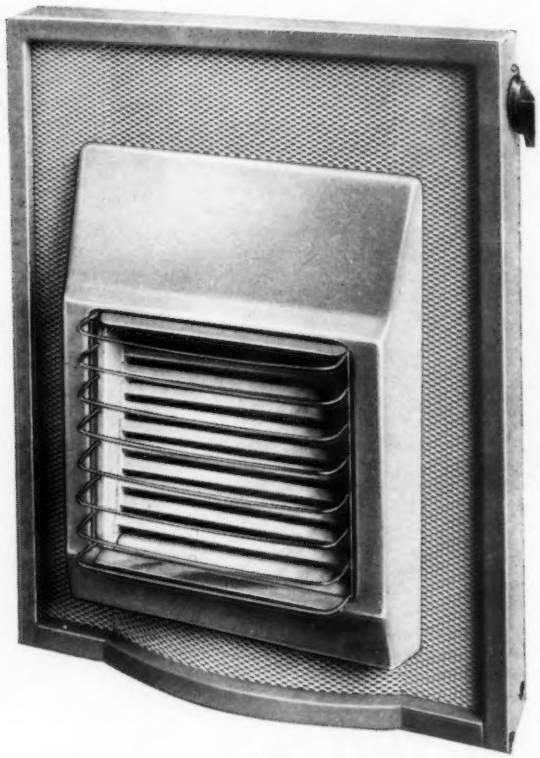

They'll want to see The CONRAY Gas Fire

All of your consumers still using an old-fashioned method of heating are potential ConRay owners. An extensive advertising campaign has been planned to introduce the ConRay to the home owner, and emphasis is on ConRay's obviously superior design and convector radiant heat principle. Make sure you are in a position to take advantage of the many enquiries you'll be receiving in the next few months.

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For details, write to GENERAL GAS APPLIANCES LTD., Corporation Road, Audenshaw, nr. Manchester.

Proprietors: Allied Ironfounders Ltd., makers of cookers, boilers, fires and baths

T.U.C. Official: The Aim's the Same

THE primary function of a trade union—to maintain and improve the living standard of working people—is still the same as before 1939, but the ways of achieving this must be different. Mr. V. Feather, Assistant Secretary to the Trades' Union Congress, asserted this at a conference of South Eastern Gas Board joint consultative committees held at Croydon, Surrey, last week.

Until 1939, he said, it was possible to try and attain this end by fighting for more money in the pay packet. 'But maintenance of living standards of our members has got to be achieved in different ways in these times in the light of a different economic situation. Therefore we are very much concerned not only with getting increased wages in relation to increased productivity but also in getting a reduction in prices.'

The T.U.C. also thought in terms of full employment. That was something worth striving for and struggling with economic problems for.

Mr. Feather, who was speaking on 'productivity and its importance to the economic structure of the nation,' had dealt at some length with the ways in which gas industry by-products gave employment to workers not directly concerned with the industry—in plastics or paint production, for instance.

He was not satisfied with limiting his field to anything less than a universal one, however. His concept of the joint consultative committee was that it should 'develop in every sector of industry' and that people who knew the significance of their work, who understood the relation of their work to the welfare of the peoples of other countries, were in a better position than those who 'work as if they are blind and are merely working at a job.' He said: 'I also believe that it adds to the mental stature and sense of citizenship among people.'

The astonished audience, who were getting more than they bargained for, heard the T.U.C. Assistant Secretary speak of those countries—India, for example—where starvation 'politely called malnutrition' was rife. 'We should bear in mind the standard of living of those people overseas—with whom we express our sympathy. India does not want our sympathy. They want tractors from us.' He said we should be prepared to help the underdeveloped countries in more practical ways.

On joint consultative machinery, Mr. Feather said that if local managements or local managers began to feel or fear that the extension of joint consultation was an interference with their authority, then it would fail, and he hoped that management would continue to utilize the machinery for the purpose of spreading knowledge about the industry.

The joint consultative committee should be utilized to increase efficiency, stability and the capacity of the industry.

Mr. W. K. Hutchison, Chairman of the Board, presided over the 480-strong meeting, which represented 62 consultative committees.

Referring to the current economic 'squeeze' Mr. Hutchison said: 'So long as these restrictions are applied fairly to all concerned, we can grumble to ourselves but we have really no cause for complaint. But I do feel it is wrong that with this call for clean air the coal fire escapes purchase tax and the gas fire is taxed at 60%.'

On public relations, Mr. Hutchison said nationalisation was born out of political strife, and politics was a game not always played with kid gloves on, so it was no surprise when the Board at first found itself subject to sometimes unfair attacks.

Mr. G. Goldsmith, Chairman of the staff side, South Eastern area joint council for gas staffs, said that in the last few months their scheme of joint consultation had been developed in a very wholesome manner. They had got out of their teething stage and were now making a contribution to the common cause.

'We are now pleased fully to recognize that management have taken a step forward towards meeting us on the mutual understanding that we have reached a stage where we are given a preview of the shape of the things to come that are going to affect us all sooner or later.'

We were facing the second industrial revolution in this country. In the first industrial revolution there was no such thing as joint consultation and it was ushered in with hostility which resulted in chaos for everyone. That must not be repeated because under their present scheme there was no reason why all the employees should not be well informed of the Board's policy.

'With the approach of the atomic and automation age,' continued Mr. Goldsmith, 'public opinion's "prize of the day" would go to the most efficient. And when it came to fuel "It has got to be us."

'Without joint consultation they should merely be the victims of rumour.'

Mr. R. Prince, Chief Engineer of the Board, spoke about the Isle of Grain project, and other speakers were Mr. E. S. Williams, Chairman, Trades' Union side, area joint committee for maintenance craftsmen, and Mr. F. C. Walker, Secretary, Trades' Union side, area gas industrial council.

Maidenhead Gasholder

Officers of the Berkshire and Buckinghamshire County Councils, the Eton Rural District Council, and the Maidenhead Town Council recently met the Deputy Chairman of the North Thames Gas Board regarding the siting of a proposed gasholder at Taplow. It was agreed that there was no suitable alternative site available. The officers made strong representations that the height of the holder should be reduced, and the Board has promised to consider their representations sympathetically. The Town Clerk of Maidenhead told his Council that the Board had accepted the position that the area was one of high amenity value. The Board's revised proposals would be submitted to the Eton Rural District Council, who would consult with the Maidenhead Town Council and the Bucks. County Council before replying to the Board.

DUKE VISITS METER COMPANY

During his recent visit to the Maryport factory of Electroflo Meters Co., Ltd., His Royal Highness, the Duke of Edinburgh, showed great interest in completed instrument and control panels, and asked many questions of Mr. B. Dunglinson, Chairman and Joint Managing Director. The panel shown here is destined for Penang. During the visit the Duke was presented by Mr. Dunglinson with a model traction engine for Prince Charles.

TRADE NEWS

Jones mobile crane

An entirely new model, known as the KL33, has now been added to the range of Jones cranes and is already in production. While replacing the 2-ton capacity model KL22 in the sense that it comes between the ¼-ton KL15 and the 4-ton KL44, it has the larger load-carrying capacity of 3 tons, with increased outreach figures. It is a fully-slewing machine capable of taking maximum rated loads without the use of outriggers, is diesel-powered and employs the direct mechanical drive which experience has shown to be the most economical and the most reliable, and which enables full engine power to be applied to each motion.

A comprehensive range of alternative jibs and chassis types is available, together with many categories of optional equipment, to give the KL33 the widest range of applications.

The jibs include channel and lattice construction types of familiar design, while special jibs such as swan-necks can be supplied. A cantilever jib has been designed to allow efficient working in confined spaces and indoors. This particular jib is new to the Jones range as its raising and lowering is actuated by a hydraulic ram, to ensure completely smooth operation.

The wheeled-chassis is available with direct drive; with two-wheel differential drive (including a locking device to give direct drive when required on soft ground); with four-wheel differential drive (an arrangement offering the performance of crawler tracks on soft ground plus the speed of a wheeled chassis on hard firm ground); and with two-wheel differential drive with axle lock and four-wheel steering.

This is claimed to be the first time that four-wheel steering has been fitted to a standard mobile crane chassis of any type. Combining the manœvrability afforded by castor steering with the full stability of a conventional four-wheeled chassis, it is said to offer a quite exceptional performance in tightly confined spaces, with the turning circle reduced to a radius of 13 ft.

The power unit is a Petter AVA2T two-cylinder air-cooled diesel, a sturdy and reliable engine which is claimed to give ample power with an extremely economical fuel consumption of about 2½ gal. per eight-hour day.

The hoisting and lowering control is equipped with an inching device designed to permit any competent driver literally to crack an egg, using a 3-ton weight in place of the usual teaspoon! This facility for delicate control does not, it is claimed, interfere with the speed of working which is said to be excellent on every motion. Gradients up to 1 in 8 (1 in 5 in extreme conditions) can be negotiated with the crane travelling light.—*George Cohen Sons & Co., Ltd., Broadway, Hammersmith, W.6.*

Jones KL33 mobile crane.

Anti-corrosion tubing

PTFE (polytetrafluoroethylene) is a polymerised plastic material which possesses the property of being more resistant to corrosive action than either gold or platinum, and is claimed to be unaffected by any known solvent. Already this material has been used successfully in the manufacture of pump diaphragms, gaskets, washers, valve discs, valve seatings, lantern rings, gland packings and many other parts which are required to withstand the action of corrosive chemicals, gases and solvents. It is now produced by Crane Packing, Ltd., in the form of tubes in a range of bores from ¼ in. (6.35 mm.) to 3½ in. (88.9 mm.), the minimum wall thicknesses ranging from $\frac{1}{16}$ in. (1.59 mm.) to $\frac{3}{16}$ in. (4.77 mm.).

Tubes made from PTFE possess the same corrosion and solvent resistant properties as the basic material, and they can be used to handle all substances, with the exception of fluorine gas and molten sodium. Any other liquid or gaseous chemical can be carried safely between temperatures of −50°F. (−45.6°C.) and 450°F. (232°C.), and the pressure resistance over the whole range is said to be adequate for most industrial purposes. A special claimed advantage of such tubing is that it is completely non-adhesive, so there is no danger of clogging and no difficulty in cleaning, no matter what chemicals it is necessary to handle.

Polytretrafluoroethylene is said to be one of the most outstanding materials developed in the last ten years. Its many unique properties give it a wide field of potential applications, more and more of which are being realized with the development of successful techniques for overcoming the special problems associated with its processing and subsequent fabrication.—*Crane Packing, Ltd., Slough, Middlesex.*

Handipump

The Plenty Pump range has recently been extended to include the Handipump which is intended to handle the smaller jobs in chemical factories, gasworks, engineering shops, power stations, and for shipping use. It is claimed to be capable of handling anything from petrol to bitumen, at pressures up to 300 lb. per sq. in., to develop 27 in. Hg. suction, to have high mechanical and volumetric efficiencies, and to be reversible and self-priming.

The pump can be used for barrel filling or emptying; fuel, lubricating oil, or grease transfer; pressure testing; starting up oil-firing equipment; draining, flushing and refilling diesels; supplying liquids to machine tools, and emptying sumps.

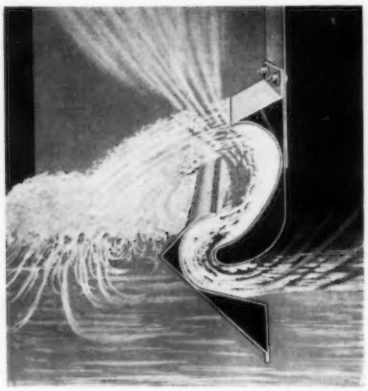
The positive action, rugged construction, and simplicity of the Handipump are claimed to assure the reliability of its performance on any of the previously mentioned applications.—*Plenty & Son, Ltd., Eagle Iron Works, Newbury, Berks.*

Dust control at Kensal Green

At Kensal Green, not only is the coke handled in a highly efficient manner, but also very special efforts have been made to ensure that dust is properly controlled and that the coke delivered to the bunkers is as free from dust as possible. To achieve this two Birtley cleaners are installed each of a nominal capacity of 10 tons. By means of powerful fans a total of 42,000 cu.ft. of air per min. is forced through the coke carrying away with it the coke dust. To collect this dust 50,000 cu.ft. of air per min. is drawn off by an exhaust system. Volume of air exhausted is considerably greater than the de-dusting air thus ensuring that there is no escape of dust laden air to atmosphere.

The dust laden exhaust is carried away through approximately 300 ft. of heavy steel plate duct to a group of four Rotoclone hydrostatic precipitators. Each of these is RCN Size 16, Arrangement D, and capable of handling 16,700 cu.ft. per min. Thus any three precipitators when in circuit could handle the exhaust volume of 50,000 cu.ft. per min., leaving one out of circuit for desludging. The necessary suction to draw the air through the Rotoclones and the duct system is provided by an A.C.I. heavy plate radial blade fan absorbing approximately 150 B.H.P. directly coupled to a 175 H.P. Lancashire Dynamo and Crypto motor.

The method of operation of the Type N Rotoclone is illustrated in the accompanying diagram from which it will be seen that the cleaning is by the combined action of centrifugal force and a thorough intermixing of water and dust laden air. The air is drawn through a horizontal static impeller the lower opening of which is partially submerged. The air flowing through this impeller at high velocity carries the water with it in a heavy turbulent sheet along the inner surface of the lower impeller blade at such a speed that it is projected across the passage and reverses direction to follow the curve of the upper blade from which it is ejected as a thick curtain that blankets the clean air chamber. The air stream passes outwards through this curtain of water, but even more important is the centrifugal force exerted by the rapid changes in direction of flow causing dust particles to penetrate the water film and become permanently trapped. This combined washing and scrubbing of the air produces such a wetting action that high efficiencies are obtained with all types of dust.



Operating principle of the Type N Rotoclone impeller.

The water in the Rotoclone is continuously re-cycled and since the water curtain is produced by air flow no pumps or nozzles are required. The water level is maintained by an overflow weir, small amounts of fresh water being added to make good evaporation and other small losses. In this installation the hoppers are equipped with large sludge doors which are opened periodically to discharge the collected sludge to concrete pits prior to final disposal. This plant is reported to be collecting about 20 tons of coke dust per week and is thus of considerable assistance in ensuring that the coke is handled in as clean a condition as possible.—*Air Control Installations, Ltd., Ruislip, Middlesex.*

Silit tube furnace

The growing need for laboratory furnaces suitable for tests and heat treatment at high temperatures has led to a very special design of laboratory furnace using an entirely new development in silicon carbide elements, *i.e.*, a heating element in the same material as the well-known Silit rods, but in the form of a tube.

The use of Silit rods for high temperatures has many advantages in long life and simple operation. These advantages are present in the Silit tube, with the overriding feature that uniform temperature distribution is inherent, owing to the form of the element. The furnace with the Silit tube element is claimed to be suitable for temperatures up to 1,500°C. The tube has a larger external diameter at the end portions and a central heating portion.

A refractory 'working tube,' in which the material to be treated is placed, is fixed in the centre of the tube, which is surrounded by another ceramic tube and the whole fitted into the steel cylindrical body, with suitable insulating material. The electrical supply is connected to the thickened ends of the tube, which, when necessary, may be withdrawn in a very simple fashion after removal of the terminal cover, connectors and working tube; this does not disturb the thermal insulation which is positioned by the outer tube. The working tube is made of an impervious refractory material which will therefore permit the use of a reducing atmosphere if necessary, without fear of the atmosphere attacking the element.

To assist accurate temperature control, the voltage applied to the heating element can be reduced by means of a tapped transformer, thus allowing the input to the furnace to be reduced so that it just maintains the furnace temperature. As the electrical resistance of silicon carbide rods and tubes increases with age, the secondary winding of the above-mentioned transformer is also tapped, thus allowing the secondary voltage to be increased when 'ageing' occurs. This tap changing is achieved by altering the position of a swing link. All the electrical equipment is housed in the bench mounting stand of the furnace and includes the tapped transformer, tapping switch, main contactor, pilot lamp (to indicate 'furnace on'), manual power regulator and ammeter.

The furnace is claimed to have the following features: Uniform temperature distribution; high temperature, up to 1,500°C.; long element life; simple construction; accurate temperature control; easy replacement of heating element.—*Siemens-Schuckert (Great Britain), Ltd., Faraday Works, Great West Road, Brentford, Middlesex.*

TRADE PUBLICATIONS

Church heating

Copies of a booklet which describes the use of gas radiant heaters in churches may be obtained from Harris Engineering Co., Ltd., York Works, Browning Street, London, S.E.17.

Scientific instruments

C. F. Casella & Co., Ltd., Regent House, Fitzroy Square, London, W.1, have published a new catalogue, No. 808, entitled *Thermometers, Hydrometers, and Scientific Instruments.*

Combustion control

A bulletin entitled *Combustion Control Systems for Gas Fired Boilers* is obtainable from James Gordon & Co. Ltd., Dalston Gardens, Stanmore, Middlesex.

Ash handling

In a brochure published by International Combustion Products Ltd., 19, Woburn Place, London, W.C.1, details are supplied of complete plant for handling ash dust and grits from boiler plants.

Atmosphere control

A new system of atmosphere control, called the 'Equiverse' system, for direct fired forge and reheating furnaces, is described in a pamphlet published by The Incandescent Heat Co. Ltd., of Smethwick.

Cyclic gasmaking

A booklet issued by The Power-Gas Corpoartion Ltd., outlines various cyclic gasmaking processes including carburetted water gas plant, blue water gas plant, complete gasification plant, high B.Th.U. oil gas plant, and Segas catalytic oil gas plant.

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'Phone: TEMPLE BAR 9910. *'Grams:* WASHER, ESTRAND, LONDON

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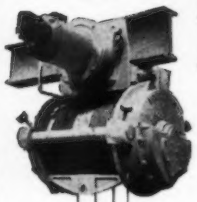
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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price **1/6d.**; by post **1/8d.**

Subscription Rates: Home and Empire:—**60/-** per annum; Foreign:—**70/-** per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at **2/-** per line (approx. **7** words)—minimum charge **10/-**. A Box Number address occupies **2** lines, and a further **6d.** is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received **14** days prior to publication if proofs are required. Type area of inside pages **10** in. deep × **7** in. wide; block screen **120**.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* King's Norton 3868.

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN REPRESENTATIVE: A. Engelhardt, T.D., 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

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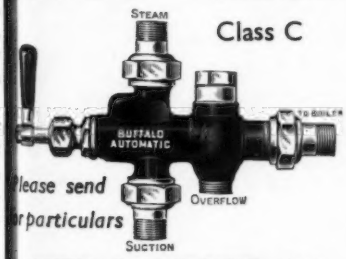

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order*, 1952.

MAINTENANCE ENGINEER

APPLICATIONS are invited for the position of Maintenance Engineer at a modern Coke & By-Product Plant in South Wales. Applicants should have a sound knowledge of the installation and maintenance of Mechanical and Electrical Plant. Applications giving age, qualifications, details of experience and salary required should be addressed to: No. 267, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

SOUTHERN GAS BOARD

CENTRAL DIVISION
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FOREMAN/ELECTRICIAN

APPLICATIONS are invited for the above position from candidates who are fully experienced in the maintenance of all types of electrical installations, both AC and DC. Salary within the range £530-£610, per annum, A.P.T. Grade 5, with initial placings according to experience. Reply with full particulars of age, experience, etc., to Athol W. Brown, Esq., Group Manager, King's Road, Reading.

ATHOL W. BROWN,
Group Manager.

P.O. Box No. 34,
King's Road,
Reading, Berks.

December 5, 1955.

TECHNICAL ASSISTANT

FOR
TOWNSVILLE GASWORKS, QUEENSLAND, AUSTRALIA

THE Townsville Gas & Coke Co., Ltd., require a TECHNICAL ASSISTANT, preferably unmarried and aged 23-28 years.

Salary: First year £1,000 per annum Australian Currency.
Second year £1,100 per annum Australian Currency.
Third year £1,200 per annum Australian Currency.

Single fare in a one class ship from England to Australia will be paid and salary will accrue from date of embarkation. Successful appointee to agree to remain in the employ of the Townsville Gas & Coke Co., Ltd., for a minimum period of 3 years.

The above company is a subsidiary of Colonial Gas Holdings, Ltd., which operates 21 gas undertakings in Australia and there are good opportunities for advancement within the parent company. Gas output at Townsville is approximately 100 mill. cu.ft. per annum, produced in Woodall-Duckham intermittent vertical retorts.

Appointee should preferably have passed the Institution of Gas Engineers' examination (manufacture) at the higher grade and have all-round gasworks' training.

Applications for the above position should be addressed to: No. 268, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

DRAUGHTSMEN required experienced in Gas and Chemical Engineering. Pension Scheme. Five-day Week and Canteen facilities. Apply: W. C. Holmes & Co., Ltd., P.O. Box B.7 Turnbridge, Huddersfield.

EAST MIDLANDS GAS BOARD

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HOME SERVICE ADVISERS—NOTTINGHAM DISTRICT, BURTON-UPON-TRENT DISTRICT, HEANOR DISTRICT

APPLICATIONS are invited for the positions of HOME SERVICE ADVISERS in the above Districts at a salary rising to £494 per annum according to qualifications and experience.

Candidates must be capable of working independently and be in possession of a recognised Diploma in Cookery and/or Domestic Science. They should be proficient in the practical demonstration of gas cooking, laundering and other appliances involving the use of gas in the home.

The positions are pensionable and the successful applicants will be required to pass a medical examination.

Applications stating District applied for, age, experience and present position, and giving full particulars of training and qualifications, together with the names of two referees, should reach the undersigned not later than Friday, December 30, 1955.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. and Derby Division,
Friar Gate,
Derby.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
APPOINTMENT OF MAINS SUPERINTENDENT

APPLICATIONS are invited for the post of MAINS SUPERINTENDENT for the Leicestershire and Rutland Group of Undertakings. The appointment will be made in Grades A.P.T. 11/12 (salary range £785/£960) and the salary at commencement will be dependent upon the experience of the person appointed.

Wide practical experience of civil engineering work, specialising in mainlaying, and proven ability in leadership are essential.

The Mains Superintendent, who will be required to reside in or near Leicester, will have direct operational responsibility, under the Divisional Distribution Engineer, for all practical gas distribution work in the Leicestershire/Rutland area; including the carrying out of all main/service laying and maintenance work, whether by direct or contract labour; the control, training and deployment of Distribution personnel, and the quality and output of their work; supervision of Distribution transport, stores and tackle; and liaison with local authority and other services. He will have a staff adequate for this purpose.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications, stating age and giving full details of experience and qualifications, if any, together with the names of three referees, should be addressed to reach the undersigned not later than January 7, 1956.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.

(*Classified advertisements continued on page* 800)

APPOINTMENTS VACANT (ctd.)

WALES GAS BOARD

THERE is a vacancy for a FIRST CLASS GAS FITTER in the Carmarthen Group of Undertakings. J.I.C. conditions and rates of pay (Provincial 'B' rating).

The successful applicant may be required to work anywhere within the Group. Housing accommodation (three bedroomed house with bathroom) is available under a standard Service Occupation Agreement.

Applications, stating age, experience and qualifications and giving the name of a referee, should be sent to the undersigned not later than December 31, 1955.

K. E. TIDDY, M.Inst.Gas E.,
Engineer & General Manager.

Gas Works,
Morfa Lane,
Carmarthen.

WALES GAS BOARD

CARDIFF UNDERTAKING

ENGINEERING DRAUGHTSMAN

APPLICATIONS are invited for the above-mentioned position at the Grangetown Works of the Cardiff Undertaking.

Candidates should possess the National Certificate in Mechanical Engineering, or equivalent qualification, and preference will be given to those having experience in the Gas Industry.

The successful candidate will be required to undergo a medical examination and to subscribe to the Board's Superannuation Scheme.

The salary will be within Grade A.P.T. 8 Provincial 'A' (£660-£740 per annum) of the scales agreed by the National Joint Council for Gas Staffs.

Applications stating full personal particulars and experience, giving the names of two referees, should be addressed to the Undersigned and posted so as to arrive within 14 days of the appearance of this advertisement.

J. POWDRILL,
General Manager & Engineer.

Gas Offices,
Bute Terrace,
Cardiff.

WALES GAS BOARD

CARDIFF UNDERTAKING

APPLICATIONS are invited for the following appointments:—

(1) Senior Industrial Gas Engineer, within the salary range of A.P.T. Grade 11 (A) (£785-£910 per annum).

(2) Assistant Industrial Gas Engineer, within the salary range of A.P.T. Grade 6 (A) (£565-£645 per annum)

of the National Salary Scales for Gas Staffs.

Applicants should have had experience in the design, construction and installation of industrial and commercial equipment and should possess a Higher Grade Certificate (Supply) of the Institution of Gas Engineers or equivalent qualification.

The successful applicants will be required to pass a medical examination, and to subscribe to the Board's Superannuation Scheme.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Undersigned and posted so as to arrive within 14 days of the appearance of this advertisement.

J. POWDRILL,
General Manager & Engineer.

Gas Offices,
Bute Terrace,
Cardiff.

EXPERIENCED SALES REPRESENTATIVE required by well-known manufacturer of Domestic Equipment to operate in the Southern Gas Board Areas. Salary, commission and expenses. Write full details to No. 269, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

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Applicants between 30 and 45 years of age should have experience in design and manufacture or operation of such equipment and should possess the necessary technical qualifications. The position is permanent and carries good prospects for the right man. There is a good superannuation scheme and other amenities.

Please write with full details of experience and qualifications stating salary required to the PERSONNEL OFFICER.

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20	L.D.C.	Screen Prot.	1440
20	Brooks	Screen Prot.	750
19	E.E.C.	Totally Enc.	1460
18	Brooks	Totally Enc.	1430
15	Brooks	Totally Enc.	955
15	E.E.C.	Screen Prot.	725/96
12	Crompton Park.	Screen Prot.	725
10	Brooks	Totally Enc.	960
10	G.E.C.	Screen Prot.	720
10	E.E.C.	Screen Prot.	715
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10	E.E.C.	Screen Prot.	570/72
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8	Westinghouse	Screen Prot.	1450
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5	Brooks	Totally Enc.	1440
5	Metro-Vick	Screen Prot.	1430
5	E.E.C.	Totally Enc.	940
5	B.T.H.	Totally Enc.	725
4.5	Metro-Vick	F.L.P.	975
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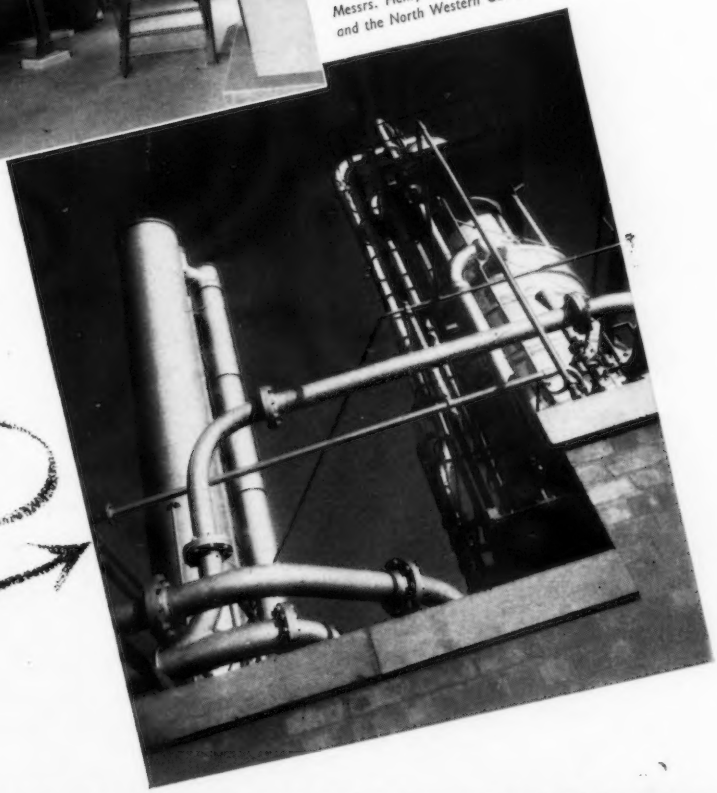

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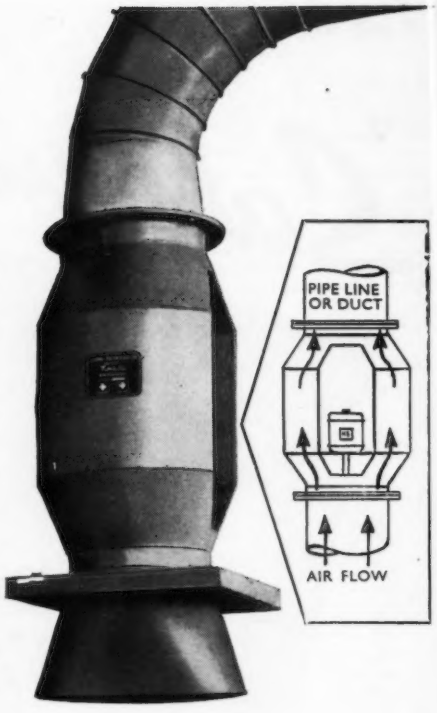

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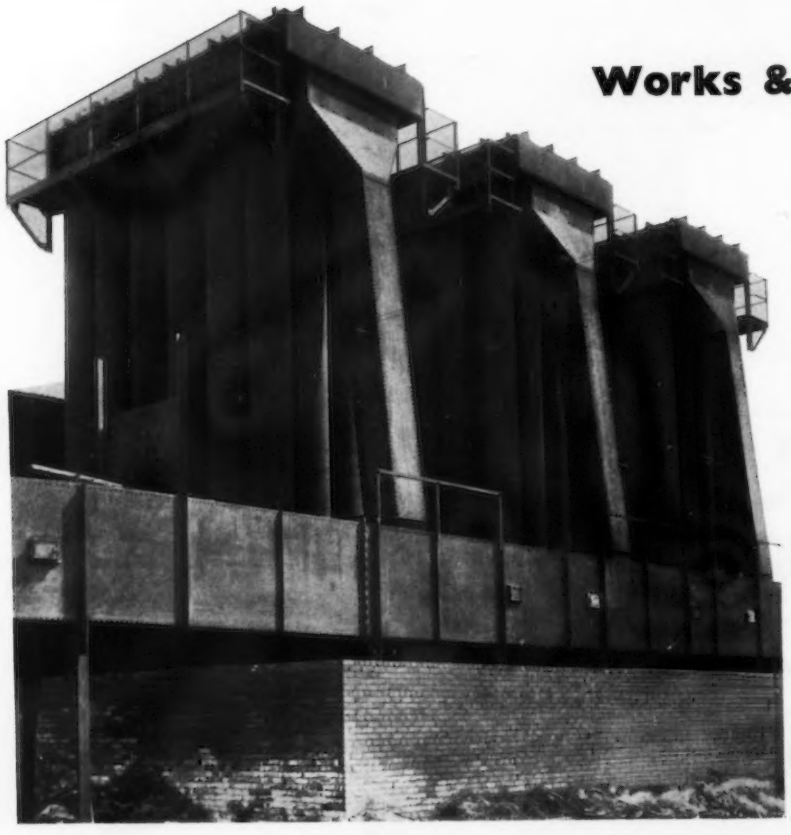

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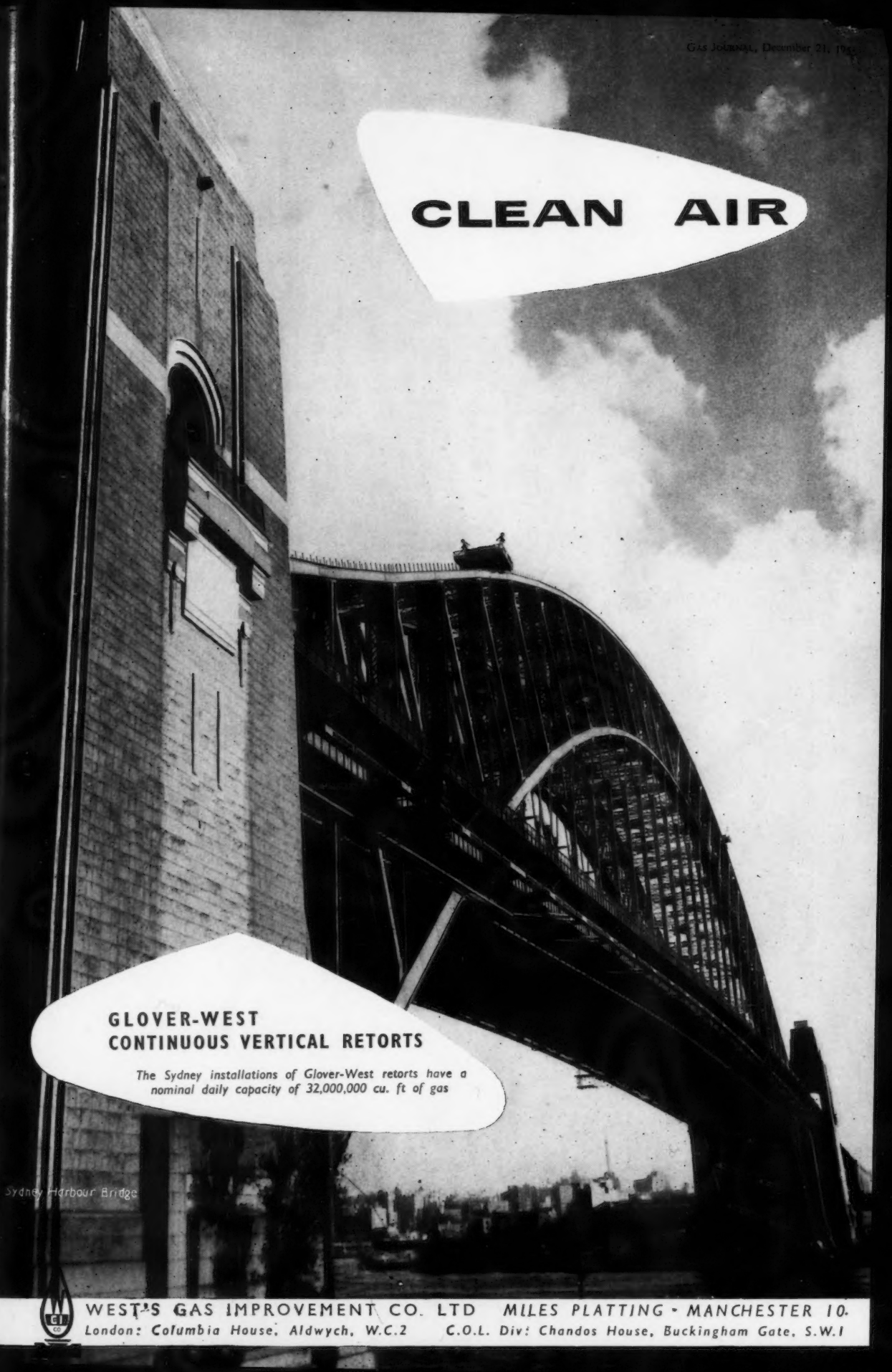
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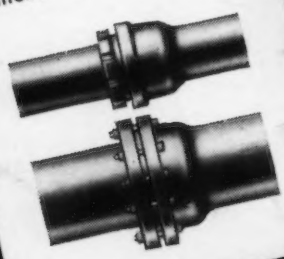

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